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TROPICAL DISEASES BULLETIN

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BUREAU OF HYGIENE AND TROPICAL DISEASES

TROPICAL DISEASES BULLETIN

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RABIES

PIRINGER, W. Die Impfmethode gegen Lyssa nach Semple. [**Anti-Rabies Vaccination by Semple's Method.**] *Ztschr. f. Hyg. u. Infektionskr.* 1944, Nov. 12, v. 126, Nos. 1/2, 7–35, 1 fig. [26 refs.]

During the period 15.5.1938–31.12.1942, when Semple's phenolized vaccine was used in Vienna for the treatment of bitten persons, there occurred but one case of rabies (23 days after infection) and one non-fatal case of post-vaccinal paralysis among the 1,735 persons treated.

Close scrutiny of the records of treated persons, classified according to the condition of the biting animal, permitted transfer of a very large number from category C (those bitten by animals simply suspect) to a new category E (those in contact with, but not bitten by, an animal which, although unknown, was yet most probably healthy). Patients in category E and in category D (where the biting animal proved healthy after observation or laboratory inoculation tests), having been at slight, if at any, risk, are not taken into account when the author calculates the incidence of rabies among the treated, but are included when he estimates the frequency of paralytic accidents. His evaluation of anti-rabies treatment, being based solely on the results obtained in respect of persons actually at risk, shows no favourable bias, therefore, *vis-à-vis* the method employed.

Apart, however, from the evidence based on statistics improperly considered, favourable results of anti-rabies treatment in recent decades may be traceable to a diminished virulence of the street virus present in some particular region such as Austria, a diminution probably effected by the occurrence of rabies in only one species.

In the author's view, until reports from Institutes, dealing with the successes and failures of anti-rabies vaccination, contain wholly accurate and comprehensive data on the occurrence of rabies among animals living in freedom or captivity and on the character of the street virus within the radius of each Institute's sphere of activity, a comparison between statistical series cannot be attempted and the value of the different methods of vaccination cannot be assessed. *G. Stuart*

SIEGLER, A. M. **Encephalitis due to Antirabies Vaccine. Report of a Case.** *U.S. Nav. Med. Bull.* 1948, July–Aug., v. 48, No. 4, 620–25. [11 refs.]

A case of an encephalitic reaction due to anti-rabies vaccine in a child with no history of allergy is described. An 8-year-old Negro boy, bitten on the left forearm by a stray dog, had had the wound cauterized immediately and on the

following day had begun a 14-day course of anti-rabies treatment with phenolized (Semple) vaccine. Two days after completion of treatment, the child developed a staggering gait and complained of headache, drowsiness and double vision in the right eye. In the course of the next two days, prior to his admission to hospital, the child experienced generalized weakness and was observed to drool, to masticate only with great difficulty and to have fine tremors in all the extremities when sitting or standing; his tongue deviated to the right and his speech was slurred and unintelligible; drowsiness and headache persisted; his temperature rose to 101·6°F.; but there were no chills, vomiting or convulsions and there was no incontinence.

Clinical examination on the patient's first day in hospital revealed *inter alia* that in the fundus there was physiological cupping, but no choking or papilloedema. The tongue protruded towards the right and drooling was noted, but associated pharyngeal and palatal movements were normal. No gross abnormal movements were observed. The abdominal and cremasteric reflexes were absent and the deep tendon reflexes all diminished, but the right triceps was more active than the left and the right biceps was more active than the left. Babinski's sign was definitely extensor on the right; but equivocal on the left. Sensation was grossly intact and there were no cerebellar signs.

On the second hospital day, a definite left central facial paralysis was noted and a paresis of the left upper eyelid.

By the seventh hospital day the extra-ocular muscles were normal, the facial paralysis had subsided and the patient had regained almost all of his muscle power. On the twelfth day the child was completely symptom-free and was discharged from hospital in excellent condition. In this case it is worthy of record that investigations at the Rockefeller Institute to exclude any known type of virus encephalitis were made on the cerebrospinal fluid and blood and were reported as negative.

In his commentary on the frequency, aetiology and treatment of the paralytic accidents of anti-rabies treatment, the author draws attention to the already sufficiently established facts: (*a*) that children, who suffer so frequently from bites, are infinitely less liable to paralyses than adults; (*b*) that the aetiological agent is undetermined; and (*c*) that there is no specific treatment for the condition. *G. Stuart*

MALARIA

WEYER, F. Bemerkungen zur gegenwärtigen Malarialage in Deutschland. [**On the Present Malaria Situation in Germany.**] Reprinted from *Ärztliche Woch.* 1948, Jan. 30, Nos. 3/4, 56–9.

Malaria in the present-day Germany seems to be a really serious problem. The extension of the theatres of war to malarious countries, the introduction of prisoners of war and the return of their own soldiers to Germany have brought about a large increase of cases. Since 1941 there have been 382 cases in prisoners of war in Brandenburg Province, 73 in the troops, 53 in foreign workers and 11 in the civilian population, 9 of these having acquired the infection locally. In 1942 there were 16 autochthonous cases; in 1943, 6; in 1944, 141, mostly in a small focus on the Tegeler See to the north-west of Berlin. After the war ended conditions became much worse. Return of troops and prisoners, the stream of refugees, lack of proper supervision, cessation of all reasonable measures of hygiene or prophylaxis, the lowered constitutional strength of the people, all played a part. There is an endemic focus of malaria in East Friesland.

The author compares the present condition with that after the first world war. In 1918–19 at Emden malaria station there were 6,839 cases and malaria was introduced during the war from the Balkan front. Small epidemics occurred in Emden in 1926 (571 cases), in 1938 (327 cases), in 1939 (213 cases) and thereafter fewer each year, 56, 16, 17, 10, 10, and 6 in 1945. Since then cases have been reported from Hamburg, Schleswig-Holstein, Lower Saxony, the Rhineland, North Württemberg, Carlsruhe, Mecklenburg and Pomerania. In the Russian zone of Berlin, up to July 1946, 662 cases were recorded, of which 220 acquired the infection in Berlin itself; thereafter cases increased rapidly in this zone; at the beginning of September more than 1,000 had been registered. In the same year over 200 cases were treated in Frankfurt-am-Oder and its environs, 3 relapses and 197 fresh cases; in Schleswig-Holstein 470 cases, 190 authochthonous; STEINIGER, who reported this, estimates that the actual cases probably numbered twice this. In a transit camp at Friedland in 1945–46 Thonnard-Neumann stated that one in eight of 12,000 of those returning home suffered from malaria.

Various races of *A. maculipennis* are found in Germany; *A.m. maculipennis* in the hills, *A.m. atroparvus* on the coast and in brackish waters, *A.m. messeae* in the interior; the second of these is the vector in East Friesland, the third in Berlin. *H. Harold Scott*

BATISTA, Djalma. O paludismo na Amazônia. (Contribuição à epidemiologia, à protozoologia e à clínica: estudo sôbre a febre biliosa-hemoglobinúrica; síntese.) [**Malaria in Amazonia.**] 212 pp., 10 charts. [Bibliography.] 1946. Rio de Janeiro: Imprensa Nacional.

This volume on malaria in Amazonia is based almost exclusively on observations made in Manaus, the capital of the State. It is claimed that the nosology of the town is more or less typical of that of the whole vast State. Manaus is situated on the River Negro some 18 km. from its confluence with the Amazon. Its population is about 65,000. It has a general hospital, *Santa Casa de Misericordia*. About one-fifth of all admissions to that hospital are on account of malaria. Malaria cases occur throughout the year, but the maximum incidence is in the months June to October, the peak generally occurring in August. These are the months of minimum rainfall, highest temperatures and lowest humidities, when water levels are at their lowest. Discontinuous collections of stagnant water provide very favourable conditions for mosquito breeding at this season.

Over a period of 22 years, malaria has been responsible for 21·4 per cent. of the total deaths in Manaus, and tuberculosis for 13·5 per cent. These two chief causes of death are not unrelated; debility caused by malaria predisposes to infection with the tubercle bacillus.

P. vivax infections predominate.

A description is given of clinical forms of malaria seen and of rare forms of the disease. Curative and preventive treatment are also considered.

Though malaria is the chief endemic disease of Amazonia, work for the amelioration of conditions should not be concentrated on malaria alone but rather directed to an all-round improvement of sanitary conditions. Special geographical considerations and the scarcity of the population in this vast area necessitate special measures. *Norman White*

SENEVET, G. Nouvelles espèces d'Anophèles. [**New Species of Anophelines.**] *Arch. Inst. Pasteur d'Algérie.* 1948, June, v. 26, No. 2, 149–61. [80 refs.]

The author reviews the advances which have been made in the systematics of *Anopheles* in the ten years from 1938. In that period, eighty-seven new species

have been described of which in the author's opinion about seventy-three have good claims to be recognized.

The paper gives a list of the new species and varieties with the type locality of each, grouping them under sub-genera. A very large proportion of these new species are described from the tropics of the New World, twenty-one of them from Brazil. The author is of opinion that some of these new names are frankly synonyms and that others are of doubtful validity. He then proceeds to discuss the limits and synonymy of certain difficult groups of sub-genera, *e.g.*, the perplexing American *Nyssorhynchus*. It is a matter of some interest that though many new species are described from the Old World sub-genus *Myzomyia* they fall easily into place in the existing scheme. This is not by any means true of some of the new American species. [It is suggested that the explanation is that owing to the careful scholarly work of EDWARDS, CHRISTOPHERS and others, our knowledge of *Myzomyia* is well founded. In contrast with this, a fog prevails over *Nyssorhynchus* in the New World, due in part to great natural difficulties, but in part also to imperfect entomology. The position will grow worse if workers in tropical America are not prepared to exchange material, to take a wide international view and describe new species in comparison with what is already known.] *P. A. Buxton*

REID, J. A. **A Preliminary Note on Malayan Forms of** *Anopheles barbirostris*. *Med. J. Malaya*. 1947, Dec., v. 2, No. 2, 125–7.

The author produces evidence of the existence of at least two forms of *Anopheles barbirostris* in Malaya. For the present, one is called the dark-winged form and the second the light-winged form. Examination of material in the collection of the Institute for Medical Research, Kuala Lumpur, suggested that the dark-winged form was typically a mosquito of the coastal plains, while the light-winged form occurred both inland in hilly districts and on the coastal plain; recent collections confirmed this. Some evidence of a circumstantial nature also suggests that the dark-winged form is a fairly formidable vector of malaria, while the light-winged form is relatively unimportant in this respect. Work is now in progress to determine this point. *H. S. Leeson*

EYLES, D. E., YOUNG, M. D. & BURGESS, R. W. **Studies on Imported Malarias. 8. Infectivity to** *Anopheles quadrimaculatus* **of Asymptomatic** *Plasmodium vivax* **Parasitemias.** *J. National Malaria Soc.* 1948, June, v. 7, No. 2, 125–33, 1 fig.

Persons infected with *P. vivax* often exhibit parasites in their blood in the absence of clinical symptoms of the disease. They are thought to be a particular danger to the community because of their liability unknowingly to infect mosquitoes. Over 2,000 *Anopheles quadrimaculatus* were allowed to bite 35 people in the asymptomatic stage of benign tertian malaria. The patients belonged to three categories, namely, just prior to a relapse, in between attacks, and at the end of attacks. All three groups infected the mosquitoes: 28 per cent. of the batches became infected and 12 per cent. of the total mosquitoes. Mosquitoes which had fed on patients with symptoms of malaria became more heavily infected (half the total batches), which was only to be expected as the degree of parasitaemia in this group was higher than in the others. The authors showed that the infection in the mosquito was correlated both with the total parasite count and the male gametocyte count. *P. C. C. Garnham*

YOUNG, M. D. & BURGESS, R. W. **Studies on Imported Malarias. 9. The Comparative Susceptibility of** *Anopheles quadrimaculatus* **and** *Anopheles maculipennis freeborni* **to Foreign** *Vivax* **Malaria.** *J. National Malaria Soc.* 1948, June, v. 7, No. 2, 134–7.

The infectivity of *P. vivax* to two important anophelines of North America (*A. quadrimaculatus* and *A. maculipennis freeborni*) was compared under identical conditions. The strains of *P. vivax* came from the Pacific, Africa, West Indies and Burma. In all, 921 *A. quadrimaculatus* gave a 44·2 per cent. infection rate; 830 *A. maculipennis* gave a 52·7 per cent. rate. The latter species also showed more numerous oöcysts. The relative susceptibility of 5 American carriers of this form of malaria was calculated to be as follows: *A. maculipennis* — 100; *punctipennis* — 86; *quadrimaculatus* — 84; *pseudopunctipennis* var. *pseudopunctipennis*—35; and *albimanus*—2. [See also YOUNG *et al.*, this *Bulletin*, 1947, v. 44, 275.] *P. C. C. Garnham*

VARGAS, L. & MATHESON, R. Estado actual del *Anopheles earlei* Vargas 1943 y *Anopheles occidentalis* Dyar & Knab 1906 con claves para larvas, pupas y adultos del llamado complejo *maculipennis* de Norteamerica. [**Position of** *Anopheles earlei* **and** *Anopheles occidentalis* **with Keys to the Larvae, Pupae and Adults of the** *maculipennis* **Group of North America.**] *Rev. Inst. Salubridad y Enfermedades Trop.* Mexico. 1948, Mar., v. 9, No. 1, 27–33, 6 figs. on 2 pls. [12 refs.]

REY, H. Revista de nuestros conocimientos sobre vectores de malaria en Colombia. [**Review of Known Malaria Vectors in Colombia.**] *Tijeretazos sobre Malaria.* Venezuela. 1947, Mar. & June, v. 11, Nos. 1/2, 30–32.

The author reviews the position of the known vectors of malaria in Colombia proved by various investigators up to December 1946. A table shows the results of stomach and gland dissections of the species, together with the place and date of origin and the name of the workers reporting them.

The following species have been found to be naturally infected with plasmodia: *A. darlingi, A. punctimacula, A. albitarsis, A. pseudopunctipennis, A. neivai.* *H. J. O'D. Burke-Gaffney*

PINOTTI, M., RACHOU, R. G. & FERREIRA, M. O. Algunos aspectos epidemiologicos de la malaria en el Litoral Sur del Brasil en la zona de transmisión por anofelinos del subgenero Kerteszia. [**Certain Aspects of the Epidemiology of Malaria in the South of the Coast of Brazil, in an Area of Transmission by** *Kerteszia.*] *Tijeretazos sobre Malaria.* Venezuela. 1947, Mar. & June, v. 11, Nos. 1/2, 1–25, 10 text figs (3 maps) & 4 figs. on 2 pls. [26 refs.]

[It will be remembered that in certain parts of Tropical America, where rainfall is high, large numbers of Bromeliad plants grow on limbs and trunks of trees. They hold water among their leaf bases, and *Anopheles* of the specialized subgenus *Kerteszia* breed in them.]

In the extreme south of Brazil, in parts of the States of Parana, Santa Catalina and Rio Grande del Sul, one finds abundant Bromeliads and three species of *Kerteszia, bellator, cruzii* and *homunculus.* The paper discusses their biology and methods which have been used for destroying Bromeliads and to control mosquitoes. The area is malarious, but it cannot be accepted that the infections are to be attributed solely to the *Kerteszia.* *P. A. Buxton*

i. MAEGRAITH, B. **Pathological Processes in Malaria.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1948, May, v. 41, No. 6, 687–99.

ii. ANDREWS, W. H. H. **The Liver Lesions in Malaria.** *Ibid.* 699–702, 5 figs. on 2 pls. [69 refs. relating to the above two papers in a combined list at pp. 702–4, and Discussion at pp. 706–13, 1 pl., 15 refs.]

i. From a study of the literature it would appear that the tissue changes occurring in malaria infections are of two types: (1) continuously progressive, and (2) periodic. Anoxaemia, vascular and circulatory disturbances are associated with the first of these; the malaria paroxysms with the second.

Anoxaemia results from defects in pulmonary ventilation and blood circulation, and from red cell destruction with consequent deficiency in oxygen-carrying capacity of the blood; parasitic invasion of the red cells and intra-vascular red cell agglutination with the formation of "sludge" [KNISELY *et al.*, see this *Bulletin*, 1943, v. 40, 584], a result of the generalized anoxia, add to this.

During the cold stage of a malaria paroxysm there is peripheral vascular constriction, a rise in blood pressure, and slowing of the circulation time. During the hot stage there is peripheral dilatation and a fall in blood pressure with increased cardiac output. The heart rarely fails, but a condition of medical shock may result from generalized vascular collapse with loss of circulating blood volume, indicated by an increased cell count and haemoglobin concentration.

Local circulatory changes are influenced by the vascular anatomy of the organs concerned, or by reflex reactions. Reflex vascular mechanisms are known to exist in the kidney and in the liver lobules. Mechanical obstruction to circulation occurs in some tissues as a result of swelling of the vascular endothelium, with an accumulation of leucocytes, parasitized red cells, and débris. True thrombosis may occasionally occur. A local loss of fluid from circulating blood, with impaction of the red cells, is a major factor in the production of vascular stasis. This takes place particularly in organs with capillaries normally impermeable to protein, as the brain and the heart, and the result is a local tissue anoxia.

The generalized circulatory changes during a malaria paroxysm are probably of central origin, and may be due to stimulation, and possibly concomitant inhibition, of certain vasomotor centres, especially in the hypothalamus, attributable to the release of a diffusable substance during parasitic sporulation. Loss of body fluid by sweating and diarrhoea is a minor contributory factor. Changes in the vascular endothelium are evident histologically, and by induction on physiological grounds; tissue anoxia is probably a factor in their production. No evidence is forthcoming that any malarial toxin plays a part in their causation. The consequent increase in permeability of the affected vessels allows protein and fluid to escape into the tissues.

In the brain, anoxia due to progressive capillary stasis leads to degenerative changes and necrosis of surrounding tissue. The cerebral lesions of malaria are not peculiar to the disease but occur in other conditions, as severe anaemia, hyperthermia, mechanical obstruction of the large vessels to the brain, and narcotic poisoning. The stasis, or near stasis, seen in the cerebral capillaries is temporary and reversible; it is not associated with true agglutination or clotting of the involved red cells. On resolution of the stasis the escape of protein through the vessel wall stops, and with the return of fluid circulation through the vessel recommences.

While vascular stasis is common in the brain it is uncommon in the liver, and it may or may not occur in other tissues. Variations in the permeability to protein of the endothelial cells of the vessels in the various organs may afford

an explanation of its irregular distribution. The brain capillaries are normally impermeable to protein, while the liver sinusoids pass it freely. In the liver the circulation is not slowed by stasis, and here anoxia is produced by local failure of flow in the central region of the lobules, owing to obstruction to the escape of venous blood. This may be reflex in origin, or be due to localized parenchymal swelling.

ii. The changes seen in the liver in malaria are inconsistent in frequency and extent; when present they take the form of centrilobular degeneration and necrosis, and are the result of tissue anoxia. The liver is congested and the central vein and sinusoids are usually filled with red cells, many of them parasitized; when anaemia is severe these may be dilated and empty. The red cells in the hepatic vessels are normal in form, and are not impacted as in the brain; evidence of stasis or of thrombosis is lacking, and the vascular endothelium appears normal. The Kupffer cells frequently are swollen and contain red cells, parasites, and débris; on rare occasions to such an extent as to obstruct the sinusoids and to distort the columns of parenchymal cells. The parenchymal cells may show only slight acidophilic granular degenerative changes, but there may be fatty degeneration, especially of the cells of the central zone of the lobule, and when these are necrotic of the peripheral cells.

Centrilobular cirrhosis has been produced experimentally in various ways: notably by reducing the oxygen content of the blood to the liver or else by diminishing the blood flow through the liver. Resistance to the outflow of blood from the liver in man may be a result of reflex constriction of smaller radicles of the hepatic vein. Experimental attempts to produce a "standard" centrilobular cirrhosis in animals by dosage with carbon tetrachloride have shown that large doses produce the effect by causing acute swelling of the polygonal cells, reflex control of the lobular flow, if it occurs, being a very minor factor. Small doses, however, do produce an effect suggesting that the latter mechanism is responsible.

In the discussion of these two papers Lt.-Col. MENECES said that the symptom picture of acute malaria with acute peripheral circulatory failure resembled the condition of acute hypoadrenalism seen in grave diphtheria and the Friederichsen-Waterhouse syndrome of meningococcal meningitis.

Lt.-Col. MANIFOLD had been impressed by the post mortem similarity between cases of shock, heat stroke, and algid malaria. He felt that acute suprarenal insufficiency with associated changes in the region of the hypothalamus and great nuclei in the brain accounted for these. In some cases the vessels of the suprarenals were dilated and loaded with parasitized cells, but the changes were not as dramatic as those in the pituitary where the dilatation of the sinuses was greater and there was complete occlusion with parasitized cells. There were few changes in the parenchymal cells of the organs, owing to the acuteness of the condition.

Brigadier BOYD said that little stress had been laid on the condition of the heart muscle in fatal cases of subtertian malaria. Fatty degeneration of heart muscle fibres was found to be a striking feature in 23 of 45 post mortem examinations of such cases in Salonika in the 1914–18 war. Cardiac insufficiency must have caused venous congestion in the liver and other organs in these, and there was no evidence of adrenal insufficiency as a cause of algid symptoms. Small haemorrhages due to parasitic capillary obstruction were of frequent occurrence, and haematuria, bowel haemorrhage, haemorrhage in the lungs and pancreas, and signs suggestive of acute appendicitis were common.

Dr. FIELD thought the old explanation of parasitic embolus adequate to explain focal lesions due to capillary blockage in malaria; and Dr. WENYON suggested that much of the capillary blockage of brain vessels by infected red cells may be due to post mortem parasitic development. Dr. CHWATT referred

to unpublished data which show that *P. falciparum* persist apparently unaltered for at least 18 hours, but that they have vanished by 36 hours after death.

Dr. MURGATROYD suggested that if changes in the permeability of the cerebral vessels in malaria permit the escape of protein through them an increase in the protein content or volume of the cerebrospinal fluid would be expected. This does not consistently occur. Dr. NICOL stated he had occasionally seen cases of peripheral circulatory failure in cases of *P. vivax* infection; the condition persisted for several days after specific antimalarial treatment. Lt.-Col. MANIFOLD reported a case of *P. vivax* infection with extraordinary hyperpyrexia and a dry theca, which at post mortem showed blocking of the choroidal plexus by parasitized cells.

MAEGRAITH in reply referred to the lesions occurring in the suprarenals and the pituitary, and their relation to the pathology of malaria. He reaffirmed that on a study of the literature there was little evidence for including cardiac failure as a common complication of malaria. It is vascular collapse rather than cardiac failure which is the commoner cause of death; the two are often confused. *A. R. D. Adams*

MASSIAS, C. A propos des fausses réactions de la syphilis dans le paludisme. [**False Positive "Syphilis Reactions" in Malaria.**] *Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1948, Nos. 24/25, 824–6.

The author discusses briefly the false positive serological reactions encountered with the use of different tests for syphilis in persons suffering from malaria. In 25 years experience, he has examined tens of thousands of sera from malaria patients, and has never found the Hecht reaction positive (nor in leprosy), provided that the technique is accurate and the reagents carefully controlled. He finds an antigen made from human heart the best. Occasionally the Hecht reaction was positive, but transient, during the eruptive stage of measles.

H. J. O'D. Burke-Gaffney

BROOKE, M. M. & DONALDSON, A. W. **Transfer of Malarial Parasites between Blood Films during Mass Staining Procedures.** *Pub. Health Rep.* Wash. 1948, July 30, v. 63, No. 31, 991–1004, 2 figs.

This paper must have given many field malariologists "furiously to think." The authors appear to have demonstrated the danger of false "positives" when slides are stained in bulk for the detection of malaria parasites.

Were the methods employed in these experiments widely used in malaria surveys, they would appear to invalidate many of the published reports. In order personally to check the results, the reviewer stained batches of slides put up by the method described and was satisfied that transfers of blood did actually take place from slide to slide in a varying proportion of cases.

On the other hand, such transfers were not detectable when mixed infected and non-infected or mammalian and avian blood slides were stained together in the upright position in ordinary staining dishes, where the distance between neighbouring slides is considerably greater than when the slides are merely separated by pieces of cardboard at one end as in the technique used in the experiments under review.

In the latter case, the separation is so small that actual contact between neighbouring slides is easily brought about by the handling necessary in the staining manipulations or even in putting up the packs of slides. One may say, therefore, that the danger of transfer of blood from one slide to another has been proved by the authors under the conditions of their experiments, but that this

does not invalidate previous survey results obtained by other methods of bulk staining. [For the experimental methods employed, the reader is referred to the detailed description in the text.] *H. E. Shortt*

Zipf, H. F. Zur klinischen Brauchbarkeit der Melaninserumreaktion von Henry bei der Malaria (Modifikation nach Trensz). [**The Clinical Value of Trensz's Modification of Henry's Melanin Reaction.**] *Klin. Woch.* 1948, May 1, v. 26, Nos. 17/18, 274–6, 3 figs. [12 refs.]

If direct examination of the blood by the thick drop method fails to reveal malaria parasites, there is need for some diagnostic means for existent or latent malaria. Twenty-one years ago Henry brought out his iron albuminate serum reaction, later the melanin reaction for serological diagnosis, but the fact that a similar reaction was given in several other diseases, such as tuberculosis, carcinoma, syphilis, leprosy, typhoid fever, pernicious anaemia and kala azar robbed it of most of its value. The author discusses this and Trensz's photometric modification of the original test and shows that readings of over 56 are alone of practical use and that below this the test is not reliable. Comparing the melanin-serum reaction (macroscopic and photometric readings) with the water flocculation reaction, he found a parallelism between them; the sera remaining clear or showing mere turbidity are to be regarded as negative, those giving precipitation as positive, *i.e.*, with photometric value of 56 or over. In latent malaria one may find lower levels; in such it is not so much the height of the reaction as its movement [variations]; therefore a series of tests should be taken and the results plotted, if we are to obtain results of diagnostic and prognostic value. For the rapid diagnosis of malaria, consequently, the melanin-serum reaction is not to be relied upon. *H. Harold Scott*

Courvès, J. M. Paludisme viscéral évolutif à symptomatologie cérébro-méningée. [**Malaria with Visceral Development of the Parasites and Cerebral and Meningeal Symptoms.**] *Bull. Soc. Path. Exot.* 1948, v. 41, Nos. 5/6, 368–71.

Barasciutti, A. & de Negri, U. Nefropatie in malarici. [**Renal Disease in Malaria.**] *Acta Med. Italica.* 1948, May, v. 3, No. 5, 117–22. English summary.

This paper contains a description of twelve cases of malaria in which concomitant renal disease was the outstanding characteristic. Nine presented signs and symptoms of acute glomerulo-nephritis, one of lipoidal nephrosis and two of chronic nephritis with uraemic syndrome. Eleven of the patients were infected with *P. vivax*, one with *P. falciparum*. The literature concerning the association of renal disease with malaria is considered at some length and the authors conclude that malaria may cause nephritis particularly in patients predisposed to renal disease. Many of the authors' patients come from the delta of the Po where they live in damp, insanitary dwellings, and are ill-nourished and underfed. Specific malaria therapy promptly produced a marked improvement, or disappearance, of renal symptoms. *Norman White*

Delanoë, G. Sur un cas de purpura hémorragique de nature paludéenne. [**A Case of Haemorrhagic Purpura due to Malaria.**] *Bull. Soc. Path. Exot.* 1948, v. 41, Nos. 5/6, 364–8.

PERVÈS, M. Réactivation et traitement des formes chroniques de l'amibiase et du paludisme. [**Reactivation and Treatment of Chronic Amoebiasis and Malaria.**] *Rev. Paludisme et Méd. Trop.* 1948, July–Aug.–Sept., v. 6, Nos. 50, 51 & 52, 197–205.

A chronic concealed reticulo-endothelial type of infection with *P. falciparum* is described and the means of its revelation and treatment are discussed. Intravenous emetine and strychnine injections are advocated in the therapy of amoebiasis. *A. R. D. Adams*

MONK, J. F. **Modern Therapy of Benign Tertian Malaria.** *Brit. Med. J.* 1948, June 26, 1221–5, 1 chart. [16 refs.]

This review of recent developments in the treatment of *P. vivax* malaria is summarized by the author as follows :

" The ideal drug for the prevention and radical cure of benign tertian malaria has yet to be discovered.

" The disuse of unaided quinine therapy is recommended.

" Suppressive and curative treatment with mepacrine is likely to be superseded by more recently discovered antimalarial drugs.

" Paludrine and chloroquine are probably equally effective in producing complete suppression of overt attacks of malaria in once-weekly dosage. Neither is able to prevent the establishment of *P. vivax* in the human host even by daily dosage, but paludrine has some inhibitive effect on the pre-erythrocytic forms. Neither drug given alone is as successful as other forms of therapy in producing a low relapse rate.

" Pamaquin is a drug which deserves greater recognition as a safe medium for the elimination of *P. vivax* infections. Given as an adjuvant in any course of antimalarial therapy it is of the greatest value in reducing the relapse rate. The toxicity of pamaquin is shown to be less formidable than is generally accepted.

" No treatment so far administered to a large series of cases of naturally occurring B.T. malaria is more successful than quinine given concurrently with pamaquin. Paludrine given concurrently with pamaquin is equally successful.

" Pentaquin given concurrently with quinine is likely to prove more successful in producing a lower relapse rate than any other therapeutic regime. The toxicity of pentaquin is approximately three quarters that of pamaquin.

" A 31-days intermittent course of quinine and pamaquin proved successful in the complete eradication of *P. vivax* infections in all patients followed up in a series of 45 cases. It is suggested that such a course is worth extended trials among chronic relapsing cases in a non-malarious area."

PARMER, L. G. **Blood and Bone Marrow Concentration of Atabrine and its Role in Aplastic Anemia.** *J. Lab. & Clin. Med.* 1948, July, v. 33, No. 7, 827–32.

Rabbits were given an intramuscular injection of 8 mgm. per kgm. of mepacrine (atabrine) dihydrochloride. They were killed at intervals and the distribution of mepacrine was examined ; the results are shown in Table 1.

There was still a considerable amount of mepacrine in the bone marrow on the 4th day, by which time the plasma, erythrocytes and leucocytes of the peripheral blood contained hardly any. In chickens, treated in the same way, the distribution at 4 hours was similar to that in rabbits ; by the fourth day, all the tissues were free from mepacrine except the liver and spleen, which contained

TABLE 1.

Atabrine concentration (Mgm./kgm.) in tissues of rabbits after an intramuscular injection of 8 mgm./kgm. of atabrine dihydrochloride.

	Time after injection			
	4 hours	4 days	7 days	11 days
Rib marrow	5·08	0·89	0·37	Trace
Proximal femoral marrow ...	4·38	1·02	0·33	Trace
Distal femoral marrow	3·11	0·69	0·21	Trace
Plasma	0·08	Trace	0	0
Erythrocytes	0·27	Trace	0	0
Leucocytes	1·87	Trace	0	0
Lymph node	3·70	1·35	1·05	0·41
Thymus	2·70	0·57	0·10	0
Liver	7·78	1·25	0·46	0·05
Spleen	40·62	1·96	0·44	0·11

small amounts. Although the erythrocytes of fowls are nucleated, the concentration of mepacrine in them was less than a third of that in the leucocytes; apparently the high concentration of mepacrine in leucocytes does not depend principally on the presence of a nucleus.

Further experiments were made on five patients with the results shown in Table 3.

TABLE 3.

*Blood and bone marrow concentration after oral administration of atabrine dihydrochloride to five patients.**

Patient	Condition	Leucocytes per cmm.	Atabrine level (μgm × liter)			
			Plasma	Erythrocytes	Leucocytes	Bone marrow
1	Malaria	7,000	42	—	—	836
2	Normal	5,500	77	55	—	1,200
3	Chronic myelocytic leukaemia ...	75,000	154	200	1,285	2,381
4	Chronic myelocytic leukaemia ...	75,000	250	392	1,589	—
5	Chronic lymphocytic leukaemia	90,000	53	57	1,864	—

* Doses varied so that absolute levels between patients are not comparable.

Although the marrow specimens were greatly diluted by peripheral blood, the concentration of mepacrine in them was high. In a discussion of these findings, it is concluded that the alleged relationship between mepacrine and aplastic anaemia is not a direct one; rather it seems to depend on idiosyncrasy.

F. Hawking

SINGH, I. **Mepacrine Dermatitis.** *Brit. J. Dermat. & Syph.* 1948, Mar., v. 60, No. 3, 90–105, 4 figs. [13 refs.]

Eighty-three cases of atypical lichen planus associated with suppressive mepacrine are described. The patients were all males; the majority were

aged between 21 and 35, and were employed as labourers on the Burma front, mostly in a civilian capacity. Sixty-three had taken an average daily dose of 0·1 gm. mepacrine for 3 to 24 months; the remaining 20 had taken a larger dose for a shorter period.

In 72 per cent. of the cases, the onset of the dermatitis was acute, with a generalized erythema followed in 24 to 48 hours by crops of red itching papules. Later manifestations were follicular hyperkeratosis, papules, plaques, and verrucose nodules.

Less commonly, the onset was insidious, with glossitis, pigmentation of the mouth and tongue, a pigmented macular rash, pruritus, desquamation, or follicular hyperkeratosis. In four cases the eyes were involved, pigmentation of the conjunctiva and conjunctivitis being observed, and in one case corneal ulceration resulting in blindness. Scalp lesions were uncommon, and no case of permanent baldness was seen. The nails were not infrequently affected.

The biological picture showed acanthosis, an increase in the stratum granulosum, hyperkeratosis, parakeratosis, and sometimes spongiosis. There was increased vascularity in the papillae and the sub-papillary layer with considerable perivascular cellular infiltration. A pigment distinct from melanin and resembling mepacrine was seen both as free granules and within the phagocytes, especially in the papillary areas and around sweat glands.

In an attempt to establish the aetiology of this condition, the author observes that no case of similar dermatitis was seen in any person who was not taking suppressive mepacrine. He was able, moreover, to produce exacerbation of the condition by giving mepacrine to the affected patients, and to reproduce it in normal subjects by giving the drug in a dose of 0·4 gm. daily for 17–52 days.

The severity of the disease appeared to be related to the amount of mepacrine stored in the skin. The result of a prolonged course of mepacrine was to produce a slow rise in the skin mepacrine level, which fell more slowly than the plasma mepacrine after the drug had been discontinued. In general, the disease was most severe in patients with low body weight, the severest cases being met with in patients weighing between 84 and 102 lb. Dosage should therefore be determined by body weight rather than age.

Treatment was designed to secure rapid elimination of the drug by giving fluids and by increasing the acidity of the urine. The nutrition was improved with a high protein diet and added vitamins. Generally it was advisable to remove patients to a cooler climate. [See also this *Bulletin*, 1947, v. 44, 499, 763.] *H. T. H. Wilson*

El-Din Nour El-Din, G. **Toxic Psychosis as an After-Effect of Atebrin.** *J. Roy. Egyptian Med. Ass.* 1948, June, v. 31, No. 6, 489–500. [15 refs.]

The author in 1933 saw a medical student who developed mania with delirium and hallucinations after intravenous atebrin [mepacrine]. He recovered within a few days. In 1944–45 atebrin was used on a large scale for malaria treatment at the research institute, Cairo; three patients showed mental symptoms [two of these three had the drug parenterally]. The drug is now used as a taenicide; a single dose of eight tablets is given, followed an hour later by a purge. No mental symptoms have resulted from this treatment. Very recently atebrin has been tried as an amoebicide, 3·5 to 4·5 gm. being given in 5 days. No mental symptoms have resulted in the 35 cases so treated.

Some details are given of the three patients who developed toxic psychoses while under antimalarial therapy, and the literature on the subject is touched on [see also this *Bulletin*, 1948, v. 45, 860]. *A. R. D. Adams*

Lucena, D. T. Tratamento da malária pelo aralen. [**Treatment of Malaria by Aralen.**] *Rev. Brasileira Med.* Rio de Janeiro. 1948, Apr., v. 5, No. 4, 269–79, 4 graphs. English summary.

Aralen is chloroquine diphosphate. This paper is already so condensed that abstraction is hardly possible. The total number of patients treated was small, 83, of whom 40 were adults and 43 were children. Infections were by all three malaria parasites and the criterion of cure was disappearance of clinical symptoms and failure to find the parasites in thick smears on three consecutive occasions. Adults were given total doses of 1·5–2 gm. (occasionally 2·5 gm.) in divided amounts spread over 1–3 days. The 43 children were divided into four age-groups: 0–4 years, 4–8, 8–12 and over 12 years and for these nine different regimens of treatment were tried. The results can, therefore, only be summarized briefly: (1) *P. vivax* infections; clinical symptoms cleared up in 24 hours and parasites in the same time in four-fifths, and in two days in the rest [would not this occur naturally in *P. vivax* infection?]. (2) *P. falciparum*; clinical symptoms again cleared up in 24 hours and trophozoites disappeared from the blood; gametocytes persisted for several days. (3) *P. malariae*; clinical symptoms cleared, as with the other parasites, in 24 hours, but the plasmodia were found for a little longer than in the case of *P. vivax* but not so long as *P. falciparum*. In the above dosage there was no sign of any toxic action of the drug. *H. Harold Scott*

Enriquez-Navarro, A. F. & Rognoni, M. Uso del Aralén (Cloroquina Winthrop) en el tratamiento de la malaria aguda en niños. [**Aralen (Chloroquine) in the Treatment of Acute Malaria in Children.**] *Archivos Hospital Santo Tomas.* 1948, Jan.–Mar., v. 3, No. 1, 35–8.

Reitsema, R. H. **The Chemistry of 4-Hydroxyquinolines.** *Chemical Reviews.* 1948, Aug., v. 43, No. 1, 43–68. [190 refs.]

Simms, B. R. & Kiker, C. C. **Temporary Dewatering in applying Deepening and Filling to permanently eliminate Mosquito Breeding Areas in Tennessee Valley Authority Impounded Reservoirs.** *J. National Malaria Soc.* 1948, June, v. 7, No. 2, 100–108, 6 figs.

The problem of malaria transmitted by *A. quadrimaculatus*, which breeds in waters along the margins of reservoirs in the Tennessee Valley, is dealt with by permanent elimination of the breeding areas; this involves two methods:—

(*a*) Deepening and filling; (*b*) Diking and dewatering.

These methods have been described by Bishop and Gartrell, this *Bulletin*, 1945, v. 42, 184.

Dewatering involves the installation of a permanent pumping station with attendant recurrent annual costs; moreover, for control of mosquito breeding, this method is not as satisfactory as deepening and filling. This paper describes the initial use of temporary diking and dewatering to facilitate deepening and filling procedure under favourable engineering circumstances; the cost of the temporary measures in this instance were 5–10 per cent. of the total deepening and filling project. It is believed that this temporary dewatering method, by means of specially designed pumps, will be widely used to extend deepening and filling projects. *R. Ford Tredre*

WALTON, G. A. **Incidence of Malaria in Tropical Africa.** [Correspondence.] *Nature.* 1948, July 17, 114.

By statistical methods based on work in Freetown, the author has produced a table which correlates the number of infective mosquito bites per child per year with a calculated parasite rate percentage in children; he claims that such values are in close agreement with observed data [see this *Bulletin*, 1948, v. 45, 401]. A 5 per cent. parasite rate meant the infection of one in six infants

Number of infective mosquito bites per child per year	0·01	0·1	0·2	0·4	1·0	2·0	5	10	50
Calculated parasite-rate per cent. in children ...	0·26	2·6	5·0	10	23	40	73	92·5	99·9

each year, or if the standard were applied to the general population of 80,000, that 13,000 people were bitten once a year by infected mosquitoes. Dr. Walton points out that in the practice of malaria control, a parasite rate of 5 per cent. is considered a splendid achievement, indicating a very low malaria incidence. In the light of his Freetown experience, he suggests that most efforts at malaria control in Africa may merely reduce the frequency of receiving infection at the cost of a partial loss of immunity without necessarily leading to any appreciable reduction of the disease; and that we must revise our conventional methods of assessing the incidence of malaria in Africa, and its effects on health and efficiency.

[The reader of this letter might infer that it is inadvisable by the application of mosquito control measures to reduce the immunity of the adult African to malaria, or alternatively if it is not possible to eliminate malaria from a locality or district in Africa it would be better not to apply mosquito control measures. The answer to this lies in the example of Freetown where, according to Dr. Walton's estimate, five out of six children evade infection with malaria and its debilitating consequences each year, whereas in earlier years every child was probably infected once a week on the average. That is surely progress in the application of the principles of preventive medicine. Sir Henry TIZARD in his presidential address to the British Association (1948) quoted the remarkable results attending mosquito control measures in that tropical territory, British Guiana. Every encouragement to the pursuance of these measures in Africa is indicated, provided that they form an integral part of general medical facilities.] *R. Ford Tredre*

VAN MEERBEECK, P. E. & DOCQ, M. Note préliminaire sur la désinsectisation des camps de travailleurs au D.D.T. [**Disinsectization of Labour Camps with DDT.**] *Ann. Soc. Belge de Méd. Trop.* 1947, Dec. 31, v. 27, No. 4, 411–18, 1 fig.

On an airfield in the Belgian Congo a block consisting of six groups, each of eight houses, was chosen as an experimental area, and half of the houses in each group were treated once with DDT, the remainder being used as controls. The product employed was a dispersible powder made by Geigy, applied as a suspension in water containing 1·39 per cent. of active DDT, and the dose applied averaged 4·9 oz. DDT per 1,000 sq. ft. Thirteen species of mosquitoes, including one anopheline, *A. gambiae*, were present and in the course of one month's observation were reduced to 10·12 per cent. of their previous numbers. The duration of effect was one month, numerous mosquitoes reappearing on the 31st day.

Analysis of results showed them to be better, during the month, than indicated by the apparent reduction. A high proportion of mosquitoes caught died within four hours, the number of apparently unaffected mosquitoes being only 0·25 per cent. of those in control houses. Engorged mosquitoes were rare, the reduction in *Mansonioides* species was greater than that in *Culex*, while *Anopheles* totally disappeared. *G. Macdonald*

NAIR, C. P. **Investigations on Rural Malaria Control in Malaya by Residual Spraying with DDT.** *Med. J Malaya.* 1947, Dec., v. 2, No. 2, 93–124, 15 charts, 5 figs. & 2 sketches. [10 refs.]

A hyperendemic malarious village near Klang in Malaya was treated with DDT solution three times between March and June, 1946. A 5 per cent. solution of DDT in kerosene was used, and applied at the rate of 4 pints per 1,000 sq. ft. (4 oz. DDT/1,000 sq. ft.) to the entire interior and exterior wall surfaces (which are usually wood planks). Surveys of malaria, mosquitoes, morbidity and mortality were simultaneously made in the experimental village and in a similar untreated village used as a control, and the effects of the treatment were interpreted on the basis of these findings.

Changes in the spleen rate, average enlarged spleen, parasite rate and gametocyte rate are set out. The spleen rate declined in the treated village from 65·3 to 39·5 per cent. without any coincident decline in the control village. Changes in the other measures are interpreted on the basis that malaria transmission cannot have occurred, in a manner with which the reviewer does not agree. The parasite rate remained relatively static in the experimental village and increased markedly in the control, but there was an increase of *Plasmodium falciparum* infections in the experimental area. Entomological findings show a marked reduction in vector anophelines, chiefly *Anopheles letifer*, and a recrudescence 20 days after the first spray, 34 days after the second.

[*Anopheles letifer* (Gater, 1941) is an important vector in Malaya; it has been much confused with *A. umbrosus* and *A. novumbrosus* until it was differentiated by Gater.] *G. Macdonald*

MILNE, J. J. C. **Malaria Control in Kuala Lumpur, Federated Malay States.** *Med. J. Malaya.* 1947, Mar., v. 1, No. 3, 140–56. [27 refs.]

This paper, which was submitted for publication in 1941 gives a historical account of malarial conditions in Kuala Lumpur up to that date, showing the dramatic results of efficient control. An interesting point is the importance latterly placed on traps with human bait as a means of checking the prevalence of vector anophelines. It is now of interest to those concerned in local conditions. *G. Macdonald*

WEATHERSBEE, A. A., ARNOLD, F. T, Jr & HOPKINS, J. P. **Observations on the Duration of Toxicity of DDT to *Anopheles quadrimaculatus* Say under Field Conditions.** *J. National Malaria Soc.* 1948, June, v. 7, No. 2, 138–43, 6 charts.

By means of adult mosquito counts on treated surfaces in animal houses and underneath human dwellings, the duration of toxicity of concentrations of DDT emulsions against *A. quadrimaculatus* was estimated as follows :—

1	per cent. emulsion	(40	mgm. per sq. ft.)	persisted	27 days.
2	„ „	(80	„ „)	„	35 „
3	„ „	(120	„ „)	„	62 „
4	„ „	(160	„ „)	„	101 „
5	„ „	(200	„ „)	„	135 „

i.e., the treated surfaces remained free of mosquitoes for these periods. Inspections were made twice each week.

By exposure of caged mosquitoes to similar sprayed surfaces it was determined that 4 and 5 per cent. concentrations still produced rapid kills of *A. quadrimaculatus* 69 and 66 days after application of the insecticide. The lesser concentrations were not so satisfactory.

Application of residual insecticides in one anopheline shelter reduced the numbers of *A. quadrimaculatus* in adjacent similar shelters. These field experiments were conducted during 1946 in the vicinity of a reservoir in South Carolina, U.S.A. *R. Ford Tredre*

ELMENDORF, J. E., Jr., assisted in Field and Laboratory Operations by K. G. BARNHILL, M. T. HOEKENGA & M. TAKOS. **Second and Supplementary Report on Field Experiments to demonstrate Effectiveness of various Methods of Malaria Control.** *Amer. J. Trop. Med.* 1948, May, v. 28, No. 3, 425–36.

This paper should be read together with a previous one [this *Bulletin*, 1947, v. 44, 882] recording survey results and techniques used. Five villages in tropical America, in which malaria was endemic and carried by *Anopheles albimanus*, were subjected to an initial survey over a period of nine months and then used for a comparison of the values of different control methods. Treatments were started in December 1945, except that in the first village treatment with oxychloroquine [no further description given] was started in April 1946. The effect on the spleen and parasite rates is summarized in the following table, in which S.R. means spleen rate and P.R. parasite rate.

Control method used		Survey results							
		1945			1946				
		Apr.	Aug.	Dec.	Apr.	May	July	Aug.	Dec.
Oxychloroquine prophylaxis	S.R.	86·3	93·6	92·9	93·3			66·7	60·9
	P.R.	41·8	78·2	82·3	41·0		12·5	26·7	5·9
DDT residual spray ...	S.R.	92·5	93·7	94·2	74·2			81·3	62·5
	P.R.	44·2	65·8	92·1	36·3			28·4	15·6
Airplane antilarval DDT	S.R.	91·6	87·7	90·7	86·6			88·4	69·8
	P.R.	31·1	54·7	85·4	61·4			54·7	12·7
Chloroquine prophylaxis	S.R.	90·7	92·7	92·9	76·9			69·0	36·8
	P.R.	33·1	38·3	67·6	6·0	5·8		9·5	2·1
No treatment	S.R.				96·8			94·5	
	P.R.				39·6			66·6	57·6

The cooperation received in the village where oxychloroquine was used as a prophylactic was much less than in that where chloroquine was used, and comparison is not possible. In assessing results, comparisons should be made between findings in the equivalent months in the treated and untreated periods. Notable features are the marked lag before the drop in the spleen and parasite rates in the villages where DDT was used as either a larvicide or an adulticide, and the eventual production of highly satisfactory results. One single treatment with DDT as a residual spray produced this result, whereas many expensive applications were made of DDT as a larvicide from aircraft [though it is not shown that this was necessary]. The authors conclude that a very satisfactory result can be obtained by one annual treatment with DDT residual spray, in which a 5 per cent. solution of DDT in kerosene is applied at the rate

of 300–400 mgm./sq. ft. (10·6–14 oz./1,000 sq. ft.), "associated with a certain amount of suppressive chloroquine administration". [From the data given this adjuvant would not appear to be needed.] *G. Macdonald*

WHITMAN, L. **The Prolonged Viability of Sporozoites of *Plasmodium gallinaceum* in Extracts of Washed Chicken Erythrocytes.** *J. Immunology.* 1948, July, v. 59. No. 3, 285–94.

Experimental malariology has been handicapped by the absence of a suitable medium in which to retain sporozoites for injection into clean animals. Even in the fluid (heparinized plasma) recommended by TONKIN [this *Bulletin*, 1948, v. 45, 243] the survival rate was not extended much beyond 24 hours. Whitman, however, has discovered a better medium which will prove of great value to workers in this field. It is an extract of chicken erythrocytes prepared in the following way. Heparinized chicken blood is centrifuged for 20 minutes at 2,500 r.p.m., the plasma is withdrawn and the cells are suspended in 4 times their volume of saline, and recentrifuged. The washing is done twice more and then the cells are centrifuged with a minimum of saline at 3,500 r.p.m. for 30 minutes in order that their exact volume might be found. The cells are resuspended in four times this volume of saline and transferred to an Erlenmeyer flask of such size that the suspension lies one inch deep. It is then frozen in a dry ice chest, thawed at 37°C. (warm water) and refrozen for another hour. It is thawed again and centrifuged at 3,500 r.p.m. for 30 minutes to remove the débris. For use, this extract is diluted 1 in 10 with physiological saline and the diluent is used both as a fluid in which to dissect the mosquito's glands and for storing the sporozoites.

It was shown that few *P. gallinaceum* sporozoites died in this fluid during the first 24 hours and many lived up to 72 hours, even at 25°C. The addition of penicillin (500 units per cc.) is said to have no adverse effect on the sporozoites [but the experiments were not done on a quantitative basis, and it is possible that only a proportion survived this treatment]. An interesting observation was made on the inhibitory effect on sporozoites of extracts containing mosquito thoracic tissue. Two birds out of six failed to become infected and in the remaining four, the incubation period was prolonged. [It is desirable that this work should be confirmed on a larger scale, because if it is so confirmed, it would require that sporozoites used for infection purposes should be obtained from dissected glands only and not from ground-up thoraces, which is a common method at present.] *P. C. C. Garnham*

DESCHIENS, R. & PICK, F. Sur la non-inoculabilité de l'embryon de la poule domestique par le sang infecté par *Plasmodium gallinaceum* Brumpt 1935. [**Failure of Blood Infected with *P. gallinaceum* to infect Chick Embryos.**] *Bull. Soc. Path. Exot.* 1948, v. 41, Nos. 5/6, 353–6.

JOHNSON, H. A. & AKINS, H. **The Effect of One Plant Extract and of certain Drugs on the Development of *Plasmodium gallinaceum* in *Aedes aegypti*.** *J. National Malaria Soc.* 1948, June, v. 7, No. 2, 144–7.

Various substances were tested on *Aëdes aegypti* to observe their effect on *P. gallinaceum* infections. The tests were performed by allowing the mosquitoes, throughout the period immediately after emergence to 14–20 days after the infective blood meal, to feed on cotton sponges moistened with 2 per

cent. sugar solution plus the test drugs. The following had slight or no effect on the development of sporozoites :—

Atebrin dihydrochloride—0·15 gm–1·3 gm. per litre.
Plasmoquine naphthoate—11·2–67 mgm. per litre.
Chloroquine base—0·25–2 gm. per litre.
Red clover extract—filtrate from 14 blossoms in 100 cc.

The following substances exerted a very marked inhibitory action :—

Quinine sulphate—0·67 gm.–1·33 gm. per litre.
Paludrine hydrochloride—0·218 gm.–0·435 gm. per litre.

In one experiment, paludrine was withheld until the sporozoites appeared in the glands and the drug was then given for 5 days ; no lethal effect on the sporozoites was observed after this delayed administration. Most of the drugs had some toxic effect on the mosquitoes and the results suggested that if higher doses could have been tolerated, an inhibitory action on the sporozoites would have resulted. Chloroquine base was very toxic to the mosquitoes, and showed little effect on development of sporozoites. *P. C. C. Garnham*

Bishop, Ann & Birkett, Betty. **Drug-Resistance in *Plasmodium gallinaceum*, and the Persistence of Paludrine-Resistance after Mosquito Transmission.** *Parasitology*. 1948, July, v. 39, Nos. 1/2, 125–37. [32 refs.]

A preliminary account of these experiments on the production of drug resistance in *P. gallinaceum* has been given by the authors [this *Bulletin*, 1947 v. 44, 969]. For this purpose they maintained a patent infection in young chickens by giving intravenous inoculations of heavily infected heparinized blood at intervals of 24 to 48 hours in order to avoid the influence of exo-erythrocytic forms. The drug was given orally in aqueous solution on the day before inoculation and at least once per day thereafter proportional to the weight of the bird. Dosage was such that multiplication of erythrocytic forms was not interfered with. Tests were made at intervals on the normal and treated strain of *P. gallinaceum* to find if resistance had developed. In the case of atebrin (mepacrine), natural resistance to the drug was not increased after 6 months' continuous treatment. With plasmoquine (pamaquin), a slight but definite resistance was detected after 8 months' treatment. In the case of paludrine, on the other hand, a forty-fold increase of resistance was observed and was not lost after five serial passages through the mosquito vector. By the use of inocula, consisting mostly of exo-erythrocytic forms, from the pulped spleen of a paludrine-resistant bird, it was shown that the exo-erythrocytic forms which arise from a resistant strain are themselves resistant to the drug, as are also the erythrocytic forms derived from them. Resistance to paludrine involved also resistance to a methyl derivative of the drug (M.4430) but not to mepacrine or pamaquin. The immunological relationships of the normal strain were unaltered after it had been made resistant to paludrine.

J. D. Fulton

Thompson, P. E., McGinty, D. A., Bush, D. L. & Wilson, Mary L. **Radioiron in Ducks and Canaries and its Effects on their Initial Malarial Infections.** *J. Infect. Dis.* 1948, July–Aug., v. 83, No. 1, 23–32, 2 figs. [21 refs.]

Radioactive colloidal iron mixtures containing Fe^{59} and Fe^{55} with a half life period of 44 days and 4 years respectively were administered parenterally to ducks infected with *P. lophurae* and canaries infected with *P. cathemerium*, in doses near the maximum tolerated to determine whether the radiation emitted (β and γ rays) had any effect on the multiplication of parasites. Radioactivity

of blood and tissues was measured by means of a Geiger-Mueller tube after digestion with acids followed by electro-plating of the iron on tinplate. In order to promote utilization of the injected radio-iron, the birds were rendered iron-deficient. Infection was produced by intravenous inoculation of blood. It was found that the iron injected intravenously or intraperitoneally was readily taken up by blood cells, but was more slowly converted to haemoglobin when given by the latter method. Before determination of the amount of radioactive iron in tissues of treated birds, blood was repeatedly withdrawn and replaced by normal citrated blood and saline and in addition the tissues were washed in water. Liver, spleen and bone-marrow contained the greatest amounts of the active material. Radio-iron was also detected in the excreta of canaries after intravenous administration of the substance.

Histological examination failed to reveal damage to organs or leucocytes due to radiation. There was no significant difference in the survival rates of birds receiving natural iron or radio-iron and any toxic effects appeared to be due to the metal itself rather than to radiation emitted. Radio-iron did not affect the course of *P. cathemerium* infections in canaries or of *P. lophurae* infections in ducks, as judged by parasitaemia and morphology of the parasites, in spite of the fact that the accumulation of pigment in the schizonts permits the maximum exposure to radiation during division. *J. D. Fulton*

PIEKARSKI, G. Experimentelle Untersuchungen zur Frage der Atebrinfestigkeit der Malariaparasiten. [**Experimental Investigations concerning Mepacrine (Atebrin)-Resistance of Malaria Parasites.**] *Ztschr. f. Hyg. u. Infektionskr.* 1948, Apr. 1, v. 127, Nos. 6/8, 501–11. [14 refs.]

Canaries were infected with *P. cathemerium*. When parasites appeared in the blood, the birds were treated daily with subeffective doses of mepacrine. The infection was then transferred to two new canaries which were similarly treated, and so on for 27 passages during 10 months. At intervals, the sensitivity of the parasites was compared with those of the original untreated strain. The strain treated with mepacrine never became more resistant to mepacrine than the normal strain; in contrast, there was some evidence suggesting that it might be more sensitive. This work was done during 1944.

[WILLIAMSON and LOURIE (this *Bulletin*, 1948, v. 45, 48) found that *P. gallinaceum* did not become resistant to mepacrine when exposed to it *in vivo* for a very long period; it did, however, become resistant to paludrine quite readily.] *F. Hawking*

BECKMAN, H. **Infectivity of Sporozoites of *Plasmodium cathemerium 3H2* exposed *in Vitro* to Hen and Canary Bloods.** *Proc. Soc. Exper. Biol. & Med.* 1948, Feb., v. 67, No. 2, 172–6.

Previous work had shown that a strain of *P. cathemerium*, maintained since 1937 in mosquito-canary-mosquito passage, was unable to infect the great horned owl, guineapig, fowl or man. The present experiments were devised to discover whether chicken's blood was lethal to sporozoites of this species *in vitro*. Heart blood was taken from uninfected canaries and from hens. Clotting was prevented by heparin or sodium citrate and the blood was retained in an incubator at 41·5°C. until the sporozoite suspension was ready to seed it. The sporozoites were obtained by triturating infected *Culex pipiens* mosquitoes in Locke's solution and filtering the product through three layers of gauze, the sporozoites appearing in the filtrate. Exactly similar amounts were then added to the canary and hen blood respectively (so that 0·05 cc. of the mixture would contain the sporozoites from 1 mosquito). The mixtures were agitated

in the incubator and samples were removed at 30-minute intervals up to 2½ hours, for inoculation into canaries.

The results were clear cut : 78 out of 80 birds inoculated with the sporozoites in canary blood developed the infection [the incubation period being delayed after the longer exposures in the incubator], while only two out of 76 birds inoculated with the sporozoites in chicken blood subsequently developed the infection. It was thus shown that the blood of the hen exerts an inhibitory action upon the sporozoites of *P. cathemerium in vitro*. *P. C. C. Garnham*

TRYPANOSOMIASIS

HORNBY, H. E. **Report on the Tsetse-Fly Problems of Maputo.** *An. Inst. Med. Trop.* Lisbon. 1947, Dec., v. 4, 313–71, 15 figs. on 9 pls. & 1 folding map.

This is the author's final report on the tsetse fly and trypanosomiasis of the Maputo district and is intended to supersede two earlier ones. It deals with trypanosomiasis of cattle and *Glossina brevipalpis*.

Maputo is the most southern district in Mozambique and lies between Swaziland and the Indian Ocean. It is a most important region because of its relationship to Lourenço Marques. The physiography and climate are briefly described ; rainfall is usually more than 100 cm. and falls mainly between October and April ; approximate temperatures [in °C.] are 18 to 38 from October to December, 5 to 28 from May to July and from 10 to 32 in April. The vegetation is described in detail and is discussed in its relation to *Glossina brevipalpis*, with a short reference to *G. austeni*.

There are about twelve plant communities, grouped into five types : (1) climax (and near-climax) forest and bush, which provides conditions suitable for the breeding of *G. brevipalpis* ; (2) tidal swamp vegetation and (3) grassland, both of which are tsetse feeding grounds ; (4) acacias, which are sometimes unfavourable to tsetse, though this depends on the nature and incidence of bush clumps ; and (5) mixed bushland, where, if there is a dense population and little stock, *G. brevipalpis* does not occur, but if the people have moved away and game has returned, bush clumps exist which are suitable breeding places. More than 400 common woody plants of the district are listed, with notes on the kind of plant and type of habitat. Some of these are illustrated by photographs.

Glossina brevipalpis occurs throughout a large part of Maputo, but to what extent is unknown. It has been taken in many places from the Zululand border to a few miles north of the Bela Vista–Changalane road ; the greatest numbers were taken along the river itself. The fly is most active after sunset, and it is almost certain that it prefers to hunt by night. Pupae are found close to a good feeding ground, in sites which are never exposed to full sunlight and never waterlogged. Such conditions are usually found under a double, but not necessarily, thick canopy. Release and recapture experiments showed that this species is a very strong flier and often travels several kilometres in one night. Some evidence was also obtained of the decline in numbers during the dry season ; most were taken between February and May and fewest in September. Cattle and other domestic animals, as well as game animals, are occasionally attacked during the daytime, but this is not the usual way by which *G. brevipalpis* gets its blood meals. The hippopotamus appears to be the most important and reliable source of food especially when these animals live near evergreen forest or bush which affords resting and breeding sites for the fly.

A trypanosomiasis survey of apparently healthy domestic animals showed that a large proportion of adult animals possess much immunity. Out of

10,880 cattle, 1,256 goats and 31 donkeys, 10·15 per cent. of the bovines and 1·83 per cent. of the goats were shown to be harbouring trypanosomes ; of the positive smears, 67 per cent. showed *T. vivax*, 16 per cent. *T. congolense* and 17 per cent. mixed infections of both. An experiment with *G. brevipalpis* and imported *G. morsitans*, to determine whether the species of tsetse had anything to do with the mildness of the cattle trypanosomiasis in Maputo, left the matter undetermined because of the failure to induce *G. morsitans* to feed. Of the 72 *G. brevipalpis* which fed on infected animals, 50 per cent. showed some development of trypanosomes ; in 11 flies (15·3 per cent.) the labial cavity had been invaded and 4 flies (5·5 per cent.) became positively infective with trypanosomes in the hypopharynx.

The mildness of the trypanosomiases in Maputo is due, in the author's opinion, to the smallness of the herds and to the good and adequate food, and possibly to an acquired immunity reinforced by subsequent infections. Though the existing conditions are far from satisfactory he considers that it would be better not to interfere unless the contact between fly and cattle could be broken completely.

In an attempt to discover whether this could be done, two experimental clearings are being made and studied. In the first, the intention is to turn all bushland into grassland with scattered trees. The second clearing adjoins the first, and here the main object is to attack all breeding sites, to ascertain and afterwards to demonstrate the kind of work which will have to be done outside settled areas in order to permit expansion as more land is required for settlement. At present, each of these areas is less than 1,000 acres, and together they are too small to safeguard the contained animals from *G. brevipalpis* ; but they may show that flies caught inside are transitory invaders and if the first clearing can be extended to a full-size settlement protected by a second, it is hoped to show that it is possible to make an area fly-free and prepare it for intensive settlement. The author has been able to supervise only the beginning of this experiment.

In a short reference to *G. austeni* only two foci of this species are described. They are both on the Changalane river where a few flies have been taken. Before economic methods of control can be worked out much more must be known about the distribution and bionomics of this species of tsetse fly.

H. S. Leeson

Ferreira, F. S. da C. Sobre o grau deinfestação por tripanosomas da *Glossina palpalis* da Guiné Portuguesa. [**The Degree of Infestation of** *Glossina palpalis* **by Trypanosomes in Portuguese Guinea.**] *An. Inst. Med. Trop.* Lisbon. 1947, Dec., v. 4, 91–7. English summary.

i. Ferreira, F. S. da C. Relatório do Chefe da Missão de Estudo e Combate da Doença do Sono na Guiné referente a 1945. [**Report of the Sleeping Sickness Survey of Portuguese Guinea for 1945.**] *An. Inst. Med. Trop.* Lisbon. 1947, Dec., v. 4, 713–49, 14 figs. (1 map).

ii. Ferreira, F. S. da C. Relatório do Chefe da Missão de Estudo e Combate da Doença do Sono na Guiné referente a 1946. [**Report of the Sleeping Sickness Survey of Portuguese Guinea for 1946.**] *An. Inst. Med. Trop.* Lisbon. 1947, Dec., v. 4, 751–89, 7 figs. (3 maps) & 3 pls.

These papers constitute a report of the organization of the campaign and the results of a year's work.

PINTO, A. R. O recenseamento dos doentes do sono. (Extracto dos relatórios semestrais referentes ao ano de 1946). [**Sleeping-Sickness Survey. Half-yearly Reports for 1946.**] *An. Inst. Med. Trop.* Lisbon. 1947, Dec., v. 4, 791–810, 7 figs. (1 map).

This record applies to a part of Portuguese Guinea, depicted in a line map, with an area of 45,000 sq. kilometres and a population of 110,000. The people were collected, with the aid of local chiefs, and specimens were taken of gland-juice, blood and cerebrospinal fluid, to confirm suspicious clinical diagnosis, the gland-juice method especially. Between the 1st March and the 31st December, 12,443 persons were examined and 248 (113 males and 135 females) were positive; 24 were children under 10 years, 61 between 10 and 20, 159 between 20 and 60 [no subdivision of these decades is given] and 4 over 60 years. The treatment adopted was by antrypol and tryparsamide. The former was given thus for an adult: First dose 0·5 gm.; three days later 1·0 gm., and thereafter 1 gm. weekly to a total of 7·5 gm. The tryparsamide was given in weekly injections of 2–3 gm. for ten weeks. The results of treatment and any accidents are not dealt with in this report; they are to be detailed in a later report of treatment. The present account includes copies of the various forms for the keeping of records. *H. Harold Scott*

HOLLINS, C. & LEWIS-FANING, E. **The Sedimentation Rate in the African Peasant with special reference to Trypanosomiasis.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1947, Oct., v. 41, No. 2, 217–40, 3 figs. [14 refs.]

The normal European blood sedimentation rate is less than 5 mm. in 1 hour, but the majority of Africans have readings of between 10 mm. and 15 mm. at one hour, and most patients suffering from trypanosomiasis have rates above 20 mm. In determining the sedimentation rate the authors mixed 4 parts of blood with one part of 5 per cent. sodium citrate solution, and they found that when the sedimentation rate is extremely rapid, as in cases of trypanosomiasis, a 10-minute reading is largely a measure of the intensity of the agglutination and a 1-hour reading is an approximation to the packed-cell volume. The cause of the high sedimentation rate of the apparently normal African is obscure. Examination of a group of African troops showed that the majority had plasma albumin to globulin rates of about unity, whereas those of Europeans average 1·7 : 1. The authors believe that the difference in the sedimentation rates is associated with this difference in the albumin-globulin ratio, and that the clinical significance of the high African sedimentation rate is an indication of diminished resistance to disease.

In trypanosomiasis the increase in the sedimentation corresponds roughly to the clinical severity of the disease, and in some districts with the changes in the cerebrospinal fluid. It may be that as the sedimentation rate rises with the progression of the disease, the rate is high by the time the nervous system is affected; or it may be that when the sedimentation rate is high the nervous system becomes susceptible to invasion. It is suggested that the sedimentation rate is an expression of the equilibrium between the patient's resistance and the virulence of the trypanosome, variation in the patient's resistance being probably a more potent factor in causing change in the sedimentation rate than is variation in the virulence of the trypanosome. In trypanosomiasis a low sedimentation rate indicates an early infection or a long-standing infection of low virulence; a high sedimentation rate probably carries a poor prognosis as it indicates a relatively low resistance on the part of the patient. Trypanocidal therapy rapidly reduces a high sedimentation rate in trypanosomiasis. Consequently, although not replacing proper clinical and laboratory examinations,

determination of sedimentation rates is a valuable auxiliary measure in assessing treatment and in the diagnosis of cryptic infections. During mass surveys sedimentation rates should be determined in all individuals in whom trypanosomes cannot be found. Patients with a high sedimentation rate may then be given a single injection of antrypol or pentamidine and re-examined a month later. Those showing a pronounced fall in sedimentation rate should be regarded as cases of trypanosomiasis.

The authors quote a large number of observations in support of their views.

F. Murgatroyd

LAUNOY, L. Essai sur la chimio-prévention, par voie orale, chez le rat, de l'infection expérimentale à *Trypanosoma gambiense* [souche Yaoundé]. (Note préliminaire.) [**Chemoprophylaxis by the Oral Route against the Yaoundé Strain of *T. gambiense* in the Rat.**] Reprinted from *Ann. Pharm. Françaises.* 1947, Dec., v. 5, 599–605.

The Yaoundé strain of *T. gambiense* has neurotropic properties in mice and rats [ROUBAUD and PROVOST, this *Bulletin*, 1942, v. 39, 234 ; STÉFANOPOULO and ÉTÉVÉ, *ibid.*, 1945, v. 42, 258 ; ROUBAUD, STÉFANOPOULO and DUVOLON, *ibid*, 1946, v. 43, 419]. The neurotropic effects are somewhat more pronounced in mice, in which the most striking feature is paralysis of the hind limbs, than in rats, which exhibit somnolence, irritability, tremors, loss of sphincter-control and sometimes paralysis.

The authors have found the incubation period of this strain in rats to average 22–23 days and the total duration of infection to vary widely around a mean of about 65 days. Previous workers with this strain in rats have found that trypanosomes are only occasionally to be seen in the blood, and then only in small numbers, a terminal septicaemia being very infrequent. LAUNOY finds now, however, that two types of infection are of most common occurrence, as follows : (*a*) Parasites slowly increase to a fairly high count, and there are then several waves of alternate trypanolysis and re-accumulation of parasites, which are frequently present in more or less great number, and can be seen until death. (*b*) Trypanosomes are never numerous in the blood, and may be absent at times for more than a month. They may continue to be scanty or absent up to the time of death. This type of infection is usually more chronic than type (*a*).

Prophylactic experiments were carried out with " Lomidine ", which is the 2 : 2′-methylene-bis-hydroxynaphthoate of pentamidine base, administered orally. This preparation is insoluble in water, but is apparently absorbed in the intestinal tract. Doses of 0·15–0·3 gm. per 100 gm. body weight were given orally, and a heavy suspension of trypanosomes was then inoculated intraperitoneally 1 to 8 days later, in 17 rats, with an equal number of controls. In another experiment the dose was 0·2 gm. per 100 gm. body weight, with a period of 4 weeks between treatment and inoculation, but there were only 2 rats, with 1 control, in this particular experiment. All the untreated rats became infected in the usual way, but those treated prophylactically remained free of infection within observation periods which varied up to about 285 days.

E. M. Lourie

LAUNOY, L. & LAGODSKY, H. Sur la prophylaxie chimique de quelques trypanosomoses animales expérimentales. [**Chemoprophylaxis of some Experimental Trypanosome Infections.**] Reprinted from *Ann. Pharm. Françaises.* 1946, Mar.–Apr.–May, v. 4, 97–8.

The following figures are given for the curative and prophylactic effects of pentamidine, administered subcutaneously to rats. [See also LAUNOY and LAGODSKY, this *Bulletin*, 1947, v. 44, 702.]

Infection	Dose, in mgm./100 gm. body weight	
	Curative	Protective (25–30 days)
T. brucei	0·5	2·0
T. equiperdum	0·7–0·9	2·0–2·5
T. evansi	7·0–>9·0	25·0

E. M. Lourie

Pifano C., F., Mayer, M., Medina, R. & Benaim Pinto, H. Primera comprobación de *Trypanosoma rangeli* en el organismo humano por cultivo de sangre periferica. [**First Demonstration of *Trypanosoma rangeli* in the Human Body by Cultivation of the Peripheral Blood.**] *Archivos Venezolanos de Patol. Trop. y Parasit. Med.* 1948, Jan., v. 1, No. 1, 1–31, 8 figs. [13 refs.] English summary.

Since the discovery by Tejera in 1920 [this *Bulletin*, 1921, v. 17, 97] of *Trypanosoma rangeli* in the gut of one of the vectors of Chagas's disease, *Rhodnius prolixus*, from Venezuela, it was suspected that this parasite had a vertebrate host as well. It was subsequently reported, alone or in association with *T. cruzi*, from Triatomid bugs of Uruguay, Colombia and Venezuela. The recent finding of *T. rangeli* together with *T. cruzi* in laboratory-bred *R. prolixus* fed on a patient suffering from Chagas's disease seemed to indicate that the first-named trypanosome was a human parasite [Dias and Torrealba, 1943 : this *Bulletin*, 1946, v. 43, 109]. Its presence in two other patients from Venezuela was also demonstrated by xenodiagnosis by Medina (unpublished), and finally in the present paper the authors record the successful isolation of *T. rangeli* in culture (NNN medium) of the blood from a girl, aged 12, in Venezuela. The patient was suspected to be suffering from Chagas's disease, but cultures revealed only developmental stages of *T. rangeli* corresponding to those found in *Rhodnius*. All attempts to infect various animals (rodents, cat, lizards, fowls) have so far failed.

The greater part of this paper is devoted to a detailed description of the stages of development of *T. rangeli* in culture and in the bug. In the latter, the flagellates occur throughout the alimentary tract and are represented by long and short crithidial forms and by slender trypanosomes measuring on the average 41·5μ and 43·6μ in length respectively. Similar forms are found in cultures. The flagellates differ from the corresponding forms of *T. cruzi* in the minute size of the kinetoplast and in other structural features, which are evident in the numerous figures illustrating the paper. *C. A. Hoare*

Dias, E. Importância continental da doença de Chagas. [**Importance of Chagas's Disease in South America.**] *Brasil-Medico.* 1948, June 5 & 12, v. 62, Nos. 23/24, 217–19. [32 refs.]

The author has brought together recent figures showing the prevalence of Chagas's disease and of the vectors of *T. cruzi* in different countries of South America. From a small zone of Bambui more than 65,000 of the bugs were sent to the Oswaldo Cruz Institute in the space of 4 years, and 14,750 from 13 huts. Cardiac lesions are common and serious ; they were present in about half the chronic cases in Minas Gerais, and in 95 per cent. of these there were signs of interference of conduction of all grades ; in nearly half blockage of the

right ramus. Sudden death from these heart conditions is common. The extent of spread of infection is evidenced by the fact that among 144 students of Tucumán, Santiago del Estero and Catamarca, 23·7 per cent. were positive by xenodiagnosis and 30 out of 72 gave a positive fixation of complement.

In Uruguay many hundreds of acute cases have been reported and TÁLICE stated in 1939 that there were 4,000–5,000 acute cases there every year. In Paraguay not many cases have been recorded but they are probably fairly numerous because infected transmitters are common in the rural dwellings. In Chile, infection was found in 40 per cent. of 9,000 triatomas examined and 31·8 per cent. of 1,445 sera of rural inhabitants gave positive complement fixation reactions. In Bolivia, 54·3 per cent. of 791 vectors examined were infected and 12·6 per cent. of 961 xenodiagnostic tests were positive, as were sera of 23 out of 74 examined. In Venezuela nearly half (48·8 per cent.) of 3,429 specimens of *Rhodnius prolixus* were positive according to MEDINA; DAS in 1945 found 56·3 per cent. positive among 2,802, and PIFANO 76·2 per cent. of 1,735 examined. Other places are mentioned but only in general terms; thus, in Panama " scores of cases and several fatal "; in French Guiana " it is well known that infected transmitters are present and also that there are cases of infection "; DAVIS and SULLIVAN found 1,909 positive results to complement fixation in Texas [the total examined is not stated].

H. Harold Scott

DE FREITAS, G. & DE CASTRO, F. T. Cultura de *S. cruzi* em meio autoclavavel, isento de células e proteinas precipitáveis. (Nota preliminar.) [**Culture of *Trypanosoma cruzi* in an Autoclaved Medium, free from Cells and Coagulable Proteins.**] *Hospital.* Rio de Janeiro. 1948, May, v. 33, No. 5, 725–30.

The English summary appended to the paper is as follows:—

" (1) The authors demonstrate that fresh blood can be substituted by an enzymatic digest of lyophilized blood, in supporting the growth of ' S. cruzi '.

" (2) A new liquid medium (DP-30) for ' S. cruzi ' is presented, free from cells, particles and coagulable proteins and sterilisable by autooclave.

" (3) The medium is basically composed of a peptic digest of blood, tryptic peptone and dextrose. Full details on the preparation are given in the developed text.

" (4) Twenty-five transfers have been obtained until the publication of this note, without any sign of decrease of the multiplication capacity of the organism.

" (5) Some preliminary counts revealed 8,000,000 individuals per cc. in tubes with 4 cc. of medium and inoculated with 25 per cent. of a culture. With large inocula, (50%) approximately 12,000,000/cc. can be obtained in flasks with 100 cc. of medium.

" (6) The culture can be done in tubes for maintaining the samples or in Erlenmeyer flasks for large scale production."

FLOCH, H. & CAMAIN, R. Deux nouveaux cas de maladie de chagas en Guyane française. [**Two New Cases of Chagas's Disease in French Guiana.**] *Bull. Soc. Path. Exot.* 1948, v. 41, Nos. 5/6, 347–50.

BRUMPT, L. C. Trois cas de maladie de chagas avec présence de cellules de Mott dans le sang. [**Three Cases of Chagas's Disease with Mott Cells in the Blood.**] *Bull. Soc. Path. Exot.* 1948, v. 41, Nos. 5/6, 350–53.

Pondé, A. La cardiopatía crónica de la enfermedad de Carlos Chàgas. [**Chronic Cardiopathies in Chagas's Disease.**] *Prensa Méd. Argentina.* 1948, June 4, v. 35, No. 23, 1075–86. [57 refs.]

The author gives an account of and discusses 73 cases of Chagas's disease from the point of view of the cardiac conditions; they were seen in the Medical Faculty of the University of Bahia, Brazil. The diagnosis in each case was made by complement fixation, with the Davis antigen, or by xenodiagnosis, in many instances by both methods. Examination of the heart was made in 40 of the patients by physical, radiographical and electro-cardiographic means. In 32 [written of as 80 per cent.] there was interference of propagation of the stimulus, auriculo-ventricular or intraventricular, and in 23 (57·5 per cent.) disturbance of the start of the stimulus and in 47·5 per cent. (19 cases) alteration of rhythm.

In more detail: partial A-V block was found in 6 patients, total in 11; I-V block of the right ramus in 19, none of the left; primary changes of the ST and T in 25, ventricular extrasystoles in 22, auricular in 4, supraventricular paroxysmal tachycardia in 1.

In an extensive table are shown the clínical manifestations—subjective and objective signs, arterial pressure, the Wassermann, Kahn or Kline reactions—the X-ray findings and the electrocardiogram of each of the 40 patients. [The preparation of this article must have entailed much work and study to which no mere abstract can do justice. Close study of the details is needed by those interested to appreciate the heart lesions of Chagas's disease.]

H. Harold Scott

Moulder, J. W. **Changes in the Glucose Metabolism of *Trypanosoma lewisi* during the Course of Infection in the Rat.** *J. Infect. Dis.* 1948, July–Aug., v. 83, No. 1, 42–9, 5 figs. [17 refs.]

Moulder, J. W. **The Oxidative Metabolism of *Trypanosoma lewisi* in a Phosphate-Saline Medium.** *J. Infect. Dis.* 1948, July–Aug., v. 83, No. 1, 33–41. [Refs. in footnotes.]

LEISHMANIASIS

Wilner, P. R. & Haedicke, T. A. **Relapsing Kala-Azar. Report of a Case with Cure effected by Stilbamidine.** *New England J. of Med.* 1948, Aug. 12, v. 239, No. 7, 250–53, 5 figs. [13 refs.]

"A case of kala-azar is reported. Difficulties in diagnosis were encountered, emphasizing the varied nature of the disease. The patient relapsed after two courses of neostibosan. Complete cure was obtained with 4·325 gm. of stilbamidine. It is suggested that kala-azar be included in the differential diagnosis of any obscure febrile illness. Stilbamidine may be considered efficacious in relapsing visceral leishmaniasis until less toxic drugs have been proved to be of value."

Giva, A. & Binaghi, G. Aterazioni cardio-circolatorie nei bambini affetti da leishmaniosi viscerale. [**Cardiovascular Changes in Children with Visceral Leishmaniasis.**] *Clin. Pediatrica.* 1947, Sept., v. 29, No. 9, 534–47, 3 figs. [27 refs.]

The authors have examined 21 children, their ages ranging between 17 months and 14 years, suffering from infantile kala azar. For each of these they have noted the systolic and diastolic arterial pressure, the venous pressure,

the pulse and respiration rates, the red and white cell counts, the haemoglobin and the electrocardiogram. The details recorded differ within fairly wide limits, particularly the blood-cell counts. The red corpuscles ranged between just over 1 million and over 4 millions, and the white corpuscles between 2,800 and 10,200 per cmm. Generally, the arterial pressure [presumably the systolic] was a little below the normal and the pulse tended to be more rapid, owing in large part at least to the anaemia present. The PQ interval was usually increased, and, taken in association with the tachycardia, is to be interpreted as a retardation of the atrio-ventricular conduction. In one only was there respiratory arrhythmia and in none was extrasystole seen. In brief, the electrocardiogram shows no valid evidence of change which can be regarded as characteristic of leishmaniasis, but merely as indicating myocardial affection which may result from a toxic factor or the anaemia present, and the absence of its modification after injection of atropine does away with the hypothesis that the blockage is of a " nervous character." *H. Harold Scott*

FEVERS OF THE TYPHUS GROUP

WEYER, F., FRIEDRICH-FREKSA, H. & BERGOLD, G. Die Beziehungen der Rickettsien zu Bakterien und Viren. [**The Relationships of Rickettsiae to Bacteria and Viruses.**] Reprinted from *Die Naturwissenschaften*. 1944, Nov.–Dec., Nos. 44/52, 361–5, 6 figs. [10 refs.]

This paper is illustrated by six photographs of *Rickettsia mooseri* ; five were taken with the electron microscope at a magnification of 40,000 diameters, and one with dark-background illumination at a magnification of 1,000 diameters. The technique employed is described.

The authors claim that the findings indicate clearly the absence of relationship between rickettsiae and the elementary or polyhedral bodies of viruses. On the other hand rickettsiae resemble bacteria in having a rounded form and a definite internal structure ; they multiply by fission ; are insoluble in weak solutions of NaOH, and contain a polysaccharide related to that of *Proteus X* strains, as is shown by the Weil-Felix reaction. *John W. D. Megaw*

GIROUD, P. & VARGUES, R. Diminution du nombre de rickettsies virulentes par dessiccation. [**Reduction caused by Desiccation in the Number of Virulent Rickettsiae.**] *C.R. Soc. Biol.* 1948, Apr., v. 142, Nos. 7/8, 438–40.

Suspensions were made from the lungs of mice heavily infected with epidemic-typhus rickettsiae ; half of each was kept at —24°C. to serve as a control, the rest was desiccated by three different methods : (1) Over calcium chloride *in vacuo* at 15°C. ; (2) Lyophilization by the method of Flosdorff and Mudd ; and (3) Lyophilization by the method of McFarlane, in which the suspension is kept at a temperature of —16°C. till desiccation is complete.

The virulence of the three products was estimated by Giroud's rabbit intradermal test ; four different dilutions of each product were injected into one flank of a rabbit and four corresponding dilutions of the control suspension were injected into the other flank. An arbitrary standard, based on the diameter and thickness of the resultant skin swellings, was adopted. The reduction in virulence of the first product was estimated as being 1,000 to 1 ; of the second it was 100 to 1, and of the third, 10 to 4.

The three products when inoculated intraperitoneally into guineapigs, and when tested for their power of fixing the agglutinins of an immune serum, showed little difference in their activity.

[Doubts may be felt as to whether the extent of the skin reaction constitutes a true index of the number of virulent rickettsia surviving in each product.]
John W. D. Megaw

DUMITRESCO, N., CONSTANTINESCO, S., BOTEZ, V. & STURDZA, N. Contribution à l'étude sérologique du typhus exanthématique. [**A Contribution to the Serology of Exanthematic Typhus.**] *Arch. Roumaines Path. Expér. et Microbiol.* 1945–1946–1947, v. 14, Nos. 1/4, 113–35. [18 refs.]

The authors describe a technique by which they claim to have obtained consistently definite results in a survey of the incidence of Weil-Felix reactions among the inhabitants of various villages of Rumania in which outbreaks of typhus had occurred or were occurring.

The percentage of positive titres between 1–200 and 1–400 was 31·1 in persons who had been attacked within the previous year: it was 10·3 among those who had been in direct contact with infected persons; 8·1 among other persons in the villages, and only 3·7 among the inhabitants of unaffected villages. No higher titres were observed among persons not actually suffering from the disease. Every patient had a titre above 1–400, and the occurrence of titres of 1–1,000 or over was regarded as evidence of the presence of the disease in a village.

Among persons vaccinated with the Weigl or Cox type of vaccine the highest titre observed was 1–250. *John W. D. Megaw*

GIROUD, P. & LE GAC, P. Parenté sérologique de la fièvre boutonneuse et du typhus épidémique. [**The Serological Relationship between Boutonneuse Fever and Epidemic Typhus.**] *C.R. Soc. Biol.* 1948, Apr., v. 142, Nos. 7/8, 436–8.

Rickettsia-agglutination tests against murine and epidemic rickettsiae were carried out on the sera of 11 patients suffering from boutonneuse fever contracted in France. Reactions against epidemic rickettsiae occurred at titres of 1–160 or over in seven patients, and in four of these cases there were also positive reactions though at lower titres against murine rickettsiae.

Weil-Felix tests were carried out on seven of the patients; four reacted with *Proteus OX19* at titres of 1–100 or over; two of these reacted also with *Pr. OX2* and one with *Pr. OXK*.

The authors conclude that there is "an antigen common to epidemic typhus and boutonneuse fever which could explain certain points that are still obscure in our knowledge of the typhus fevers." *John W. D. Megaw*

COMBIESCO, D. Séro- et chimiothérapie dans le typhus exanthématique expérimental chez le cobaye. [**Serum Therapy and Chemotherapy of Experimental Typhus in Guineapigs.**] *Arch. Roumaines Path. Expér. et Microbiol.* 1945–1946–1947, v. 14, Nos. 1/4, 264–6.

A brief preliminary note stating the results obtained from experiments to be described in a later paper. *John W. D. Megaw*

LEY, H. L., JR., SMADEL, J. E. & CROCKER, T. T. **Administration of Chloromycetin to Normal Human Subjects.** *Proc. Soc. Exper. Biol. & Med.* 1948, May, v. 68, No. 1, 9–12, 2 figs.

Courses of chloromycetin were given by the mouth to three healthy medical men as a preliminary to a trial of the drug on typhus patients.

The levels of the drug in the blood and urine were tested by a modification of a method devised by JOSLYN and GALBRAITH and personally communicated by them to the authors; this is based on the inhibition of the growth of *Shigella sonnei*.

Initial doses of 1·0 gm. followed by a ten-days' course of 1·0 gm. daily in five divided doses were given to two of the volunteers.

In a second test initial doses of 2·0 gm. followed eight hours later by single doses of 0·5 gm. were given. Appreciable amounts of the drug were detected in the blood within 30 minutes of the first dose; excretion was rapid and no ill effects were detected by examination of the blood and urine or by the volunteers themselves. *John W. D. Megaw*

SMADEL, J. E., LÉON, A. P., LEY, H. L., Jr. & VARELA, G. **Chloromycetin in the Treatment of Patients with Typhus Fever.** *Proc. Soc. Exper. Biol. & Med.* 1948, May, v. 68, No. 1, 12–19, 6 figs.

Five typhus patients in a hospital in Mexico D.F. were treated with chloromycetin by mouth under close expert observation. Three of the patients were adults suffering from epidemic typhus and two were children, one of whom had epidemic typhus and the other had murine typhus. The differential diagnosis was based on rickettsia-agglutination and complement-fixation tests, the former of which in four of the five cases and also in three of six untreated cases became positive several days earlier than the latter.

The detailed case reports suggest that the drug may have been beneficial, but the authors are cautious in their conclusions, which are that the drug is relatively safe and that the effects were sufficiently encouraging to justify further tests.

The dosage suggested is an initial dose of 40 mgm. per kilo of body weight followed by a total daily dose of 35 mgm. per kilo given in divided two-hourly doses till improvement is noticed and then by a maintenance total daily dose of 20 mgm. per kilo given in divided amounts every four hours till the 13th or 14th day after the onset. *John W. D. Megaw*

ORTIZ MARIOTTE, C. Vacuna profiláctica contra el tifo: prueba de campo. [**Prophylactic Anti-Typhus Vaccine; a Field Test.**] *Bol. Oficina Sanitaria Panamericana.* 1948, Apr., v. 27, No. 4, 330–41. English summary.

A field test was carried out in strictly controlled conditions in three rural areas of South Mexico. The vaccine used was of the bivalent, Castañeda type containing four parts of murine rickettsiae and one part of epidemic rickettsiae.

Among 234 vaccinated persons there were 15 attacks of clinical typhus [apparently louse-borne] and among 214 comparable controls there were 18 attacks. The average severity of the attacks in the vaccinated group was considerably less than in the controls; 17 of the control patients had "severe" or "average" attacks whereas only 6 of the vaccinated fell into these grades. Although the difference in severity is regarded as statistically significant the authors regard the figures as too small to justify final conclusions.

The trial was carried out in 1942–1943, and the authors mention that an improved vaccine has given good results among persons specially exposed to the risk of infection since 1945. *John W. D. Megaw*

SAVOOR, S. R., VAHIA, N. S. & SOMAN, D. W. **Typhus in Bombay. Part III: Identification of Strains.** *Indian Med. Gaz.* 1948, Feb., v. 83, No. 2, 70–74. [15 refs.]

Strains identified as *Rickettsia mooseri* were isolated from the blood of five patients in Bombay, by mouse inoculation. With simultaneous guineapig

inoculation only three of the strains were isolated, and as the spleen and brain of infected mice remained infective to guineapigs for at least two months the mouse is regarded as the animal of choice for recovering and maintaining infection.

All the strains were orchitic, and in other respects gave reactions regarded as indicating a murine type of infection.

A similar strain was isolated from a pooled suspension of the brains of four rats from a house in which a case of the disease had occurred ; pools made from the brains of 19 other rats from this house were not infective.

One of the human strains was transmitted, from guineapig to guineapig, from rat to rat, and from mouse to mouse, by the bites of *Xenopsylla cheopis*.

One strain was maintained in rats for 20 successive passages.

Each of the three strains tested caused complete cross immunity in guineapigs against the other two strains ; but guineapigs convalescent from the infection were still susceptible to the Wilmington strain of murine rickettsiae, though only two of the five guineapigs tested developed a scrotal reaction. On the other hand the Wilmington strain caused complete immunity against the Bombay strains, which, therefore, were regarded as being of lower virulence.

Complement-fixation tests were not carried out and doubts are expressed on the reliability of this reaction ; it is stated that a murine strain similar in every respect to the Bombay strains was isolated from a patient in Mysore whose serum had been tested by TOPPING and had been regarded by him as giving a fixation reaction indicating a closer relationship with Rocky Mountain spotted fever than with murine typhus.

[The occurrence of this conflict in evidence makes it all the more desirable to carry out complete serological tests.] *John W. D. Megaw*

BALTEANU, I. & CONSTANTINESCO, N. Sur une nouvelle rickettsiose murine. [**A New Murine Rickettsial Infection.**] *Arch. Roumaines Path. Expér. et Microbiol.* 1945–1946–1947, v. 14, Nos. 1/4, 136–85, 15 figs. & 2 pls. (1 coloured). [11 refs.]

In a long paper the authors describe an exhaustive investigation of a murine strain of rickettsia isolated by inoculating guineapigs with a pooled suspension of the brains of four rats trapped in Jassy, Rumania. One of the rats had a Weil-Felix reaction at a titre of 1–600. The strain was regarded as intermediate between epidemic and murine rickettsiae. It caused an intense febrile and tissue reaction in guineapigs but was non-orchitic. In the earlier transfers through guineapigs, brain substance alone was used as the inoculum and there was a considerable falling off in virulence, but when blood or spleen-suspension was used the virulence at once became greater and it remained constantly high through the rest of the series of 63 transfers. Transfer through a rat also caused an increase in the virulence of the attenuated strain ; this had become non-infective to mice but by the 20th passage the brain and spleen of infected mice caused a sharp febrile and orchitic reaction in guineapigs.

Rabbits, dogs, and spermophiles were susceptible, but cats resisted attempts at infection.

A human volunteer was inoculated subcutaneously with brain substance of the guineapig of the 1st passage, and developed a febrile attack lasting 12 days ; there was a papular rash, and the Weil-Felix reaction was positive in rising titre which reached 1–400 by the end of the attack.

Another volunteer was inoculated with brain and spleen suspension from a guineapig of the 42nd passage. He had an inapparent reaction, detected only by the isolation of rickettsiae from the blood. Three other persons, inoculated in the same way from guineapigs of various passages, did not react.

The spermophile, *Citellus citellus*, harboured infection for at least 40 days in its brain and spleen and was regarded as the animal of choice for maintaining the strain. There was no cross-immunity with epidemic-typhus rickettsiae. Many other observations were made but there is no mention of complement-fixation or rickettsia-agglutination tests. *John W. D. Megaw*

LIU, Wei-T'ung, WANG, Pe'i-Jen & CHING-CHANG, Hwei. **Typhus-like Fever of *Proteus vulgaris OXK* Type in Northwest China. Report of Six Cases.** *Chinese Med. J.* Shanghai. 1948, Mar., v. 66, No. 3, 130–40. [23 refs.]

Six cases are described in which the *Proteus OXK* type of Weil-Felix reaction occurred at titres of 1–160 to 1–640 ; one of the patients reacted against *Pr. OX19* at a titre of 1–80 ; all the others were negative with *Pr. OX19* and *Pr. OX2*.

In four of the cases complement-fixation tests against epidemic-typhus antigens were carried out ; three were negative, but one reacted at a titre of 1–1,024 though his serum did not agglutinate *Pr. OX19* or *OX2*.

Among 353 normal persons in the area only two gave an *OXK* reaction (at a titre of 1–80), and among 37 typhus patients only three gave *OXK* reactions, at titres ranging from 1–80 to 1–320.

In view of the above and other considerations the authors conclude that the cases "might represent a disease closely related to, if not identical with tsutsugamushi disease".

Five of the patients were residents of Lanchow, situated on the Yellow River which periodically floods the city and its suburbs.

It is stated that FAUST in 1923 found organisms, which he regarded as resembling *Richettsia nipponica*, in spleen sections from two patients in Wuchang and that he suggested the possible occurrence of tsutsugamushi disease in the lower Yangtse Valley. Apart from this the only previous evidence of the occurrence of the disease in China is said to be the recent finding by WEI of typhus cases of the *Pr. OXK* type in Kunming in South-West China.

John W. D. Megaw

KELSEY, W. M. & HARRELL, G. T. **Management of Tick Typhus (Rocky Mountain Spotted Fever) in Children.** *J. Amer. Med. Ass.* 1948, Aug. 14, v. 137, No. 16, 1356–60, 3 figs. [Refs. in footnotes.]

The authors point out that tick typhus is now more prevalent in some Eastern States than in the Rocky Mountain area which till recent years was regarded as the only part of the world in which the disease occurred. In 1945 only two cases were reported from Montana, and six from Idaho, whereas 99 were reported from Virginia and 57 from North Carolina The case-mortality rate in North Carolina during 1944 and 1945 was nearly 32 per cent.

The present paper deals with 27 cases among children ; there were seven deaths, but this high mortality rate is attributed to the fact that most of the patients were sent to hospital because their condition was critical.

Only 50 per cent. of the patients were known to have been bitten by a tick shortly before the onset. With the Weil-Felix test the highest titres observed were the *Proteus OX19*, though in one patient who died the *OX2* and *OXK* strains gave higher titres. The complement-fixation test was indicative of tick-borne infection though three patients gave reactions against murine rickettsiae, but in each case at a lower titre.

Treatment with hyperimmune rabbit serum was tried in some cases ; among the six patients whose treatment was started within three days of the onset there was no death, but two patients treated from the 5th day onwards died, and the mortality in the serum-treated group as a whole was 25 per cent.

The general treatment was supportive; the authors believe that several patients were saved who otherwise would have died. A high intake of proteins and vitamins was maintained.

In the discussion one speaker rebuked the authors for using the name tick typhus; he said that this name would apply equally to boutonneuse fever which was a different disease. The senior author defended the name on several grounds, especially because the name Rocky Mountain spotted fever had misled many practitioners by suggesting that the disease was limited to a geographical region, and because the name tick typhus correlates the disease with the vector, just as happens with the names louse-borne typhus and murine typhus.

John W. D. Megaw

COMBIESCO, D. Sur une épidémie de fièvre boutonneuse observée à Constantza-Roumanie. (Deuxième-mémoire.) [**An Epidemic of Boutonneuse Fever observed at Constanţa (Rumania).**] *Arch. Roumaines Path. Expér. et Microbiol.* 1945–1946–1947, v. 14, Nos. 1/4, 99–112, 8 charts. [46 refs.]

This paper is a much delayed continuation of a memoir published in 1932. It deals with an epidemic of boutonneuse fever in which 34 cases were observed in Constanţa in the summer of 1931. The author now describes the isolation, in September, 1933, of rickettsiae from ticks (*Rhipicephalus sanguineus*) collected from dogs in Constanţa. Inoculated guineapigs sometimes developed a scrotal reaction. There was no cross immunity between the rickettsiae and those of epidemic typhus.

John W. D. Megaw

YELLOW FEVER

FINDLAY, G. M. **John Williams and the Early History of Yellow Fever.** *Brit. Med. J.* 1948, Sept. 4, 474–6. [14 refs.]

MAHAFFY, A. F. **The Epidemiology of Yellow Fever.** *J. Roy. San. Inst.* 1948, Sept., v. 68, No. 5, 534–8. [14 refs.]

CAUSEY, O. R. & KUMM, H. W. **Dispersion of Forest Mosquitoes in Brazil. Preliminary Studies.** *Amer. J. Trop. Med.* 1948, May, v. 28, No. 3, 469–80, 2 figs.

Two experiments with forest mosquitoes were made in the Passos region in Minas Gerais, Brazil from April to June, 1947, during an investigation into the rôle of these mosquitoes in the dispersion of yellow fever. The object of the first experiment was to determine whether marked mosquitoes could be recaptured and whether they remained localized or left the point of liberation. 1,670 *Haemagogus spegazinnii*, 903 *Aëdes leucocelaenus* and 8,752 specimens of other sylvan species were therefore marked and released. During fifteen of the following seventeen days 2,074 (18·3 per cent.) mosquitoes were recovered. The percentages of recaptures were of *H. spegazinnii* 9·2, of *Aëdes leucocelaenus* 50·6, and of the other species 16·7. Almost half were taken at the point of release and others in the neighbouring forests; 3 *H. spegazinnii*, 10 *Aëdes leucocelaenus* and 27 others were found in a forest one kilometre from the release point beyond an intervening open pasture. Most were recovered during the first four days; the last *H. spegazinnii* on the fifth day and the last *Aëdes leucocelaenus* on the twelfth day.

The second experiment was designed to discover the usual flight range of forest mosquitoes. The above-named species were not available in large numbers but other species were common. Among the released species were *Aëdes serratus* (6,598), *Aëdes scapularis* (2,879), *Taeniorhynchus chrysonotum* (6,876) and *T. fasciolatus* (6,019). In all 31,689 mosquitoes of sixteen species were used. Recaptures were made on twenty-five days during a thirty-day period, 614 at the point of release and 29 in 11 of 28 outlying forests. Species recaptured 800 metres or more from the release point were *Aëdes serratus* (16), *Aëdes scapularis* (5), *Aëdes crinifer* (1), *Psorophora ferox* (4), *Anopheles sp.* (2) and *Chagasia fajardoi* (1). *Aëdes serratus* was recaptured in the greatest numbers and over the longest time (25 days) ; it was also found at the greatest distance (4·7 kilometres). *Aëdes scapularis*, an experimental vector of yellow fever, was recovered at a distance of more than 4 kilometres, and 11 days after release.

H. S. Leeson

DE AZEVEDO, J. F., CAMBOURNAC, F. J. C. & PINTO, M. R. Resultados de um inquérito sobre febre amarela na Guiné Portuguesa. [**Results of a Yellow Fever Survey in Portuguese Guinea.**] *An. Inst. Med. Trop.* Lisbon. 1947, Dec., v. 4, 17–24. English summary.

"1. The authors carried out a survey on the presence of yellow fever in the territory of the Portuguese Guinea by using mouse protection tests made with blood sera from indigenous people.

"2. The sera were collected in most of the regions of the territory and in the people of all localities visited there were some sera which gave positive mouse protection tests.

"3. Positive results have been found with sera from people between 7 and 70 years of age.

"4. As previous to the survey mass vaccination against yellow fever had been started in almost all the regions of the territory, it is possible that at least some of the positive tests were due to the prophylactic inoculations.

"5. In one locality in which no prophylactic inoculations had been performed, it was observed a positive test with a serum from a person 70 years old, which is the proof that at least in the past there were cases of yellow fever in that region.

"6. As the number of the tests made is small and possibly most of the people observed had been inoculated previously with yellow fever vaccine, it is not possible to draw definite conclusions about the presence of the disease in the territory of the Portuguese Guinea, except for one locality as mentioned above.

"7. As it is also possible that some of the positive tests may indicate cases of yellow fever, it is advised to continue with the prophylactic measures already started and that all the people coming from outside the territory should be inoculated against yellow fever."

DENGUE AND ALLIED FEVERS

PAUL, J. R., MELNICK, J. L. & SABIN, A. B. **Experimental Attempts to transmit Phlebotomus (Sandfly, Pappataci) and Dengue Fevers to Chimpanzees.** *Proc. Soc. Exper. Biol. & Med.* 1948, May, v. 68, No. 1, 193–8, 3 figs. [10 refs.]

Sandfly fever virus contained in human blood samples from Cairo was inoculated subcutaneously and intracutaneously into six chimpanzees. The

only reactions observed were short attacks of fever and listlessness in the two animals which allowed their temperature to be taken.

The incubation period was five days and the fever lasted about six days in both cases. In one animal the chart shows two " humps spaced about four days apart " and in the other the fever curve appears to be of the " saddle-back " type. No conclusion was reached regarding the susceptibility of the animals.

Nine chimpanzees were inoculated with strains of dengue virus contained in serum taken three years earlier from human volunteers and kept in a box containing solid CO_2. The temperature of five animals could be recorded; each of the charts shows a slight rise of temperature between the 5th and 10th day after inoculation, and a second slight rise between the 12th and 17th day. Mouse-neutralization tests showed the complete absence of antibodies before inoculation and the presence of abundant antibodies 54 days after inoculation. There was, therefore, evidence of the occurrence of an inapparent infection. *John W. D. Megaw*

Melnick, J. L., Curnen, F. C. & Sabin, A. B. **Accidental Laboratory Infection with Human Dengue Virus.** *Proc. Soc. Exper. Biol. & Med.* 1948, May, v. 68, No. 1, 198–200, 1 fig.

In the course of the experiments described in the previous paper one of the assistants accidentally received a drop of dengue-infected serum in his eye. Seven days later a macular rash was seen on the face, and after a further period of two days there was a sudden attack of fever and vomiting. The temperature remained between 101° and 103°F. for about six days.

The mouse-neutralization test was negative on the first day of the fever and became progressively more strongly positive in tests made on the 13th, 25th and 45th days after the onset. *John W. D. Megaw*

PLAGUE

Public Health Rep. Wash. 1948, Aug. 20, v. 63, No. 34, 1102–5. **Plague Infection reported in the United States in 1947.**

No naturally-acquired human case of plague has been reported in the United States since 1943. A fatal case is now reported in a 12-year old boy living in Alturas, Modoc County, California. It is believed that he was infected near a Ranger Station, 13 miles south-east of Alturas. Wood rats in this area were found to be infected later in the year. Plague infection had previously been reported from Madoc County in 1934, 1935, 1936 and 1942.

It is significant that the last two human cases of plague reported from the U.S. in 1943 and 1942 respectively occurred in Siskiyou County which borders Modoc County to the west.

Gradual extension to the east of infection in wild rodents or their ectoparasites has already been noted [this *Bulletin*, 1948, v. 45, 171]. This fact, coupled with the occurrence of occasional human plague infections in the U.S. indicates that the disease is still a problem in that country and that unless control is maintained rigorously " plague infection can be expected to extend into any city in the western States having a substantial rat population " and might well even spread to rodents of the Great Plains, the Mississippi Valley and the eastern States.

During 1947, infection was reported in 13 species of wild rodents or their parasites in six western States, namely Arizona, California, Colorado, Kansas,

Washington and Texas. The pools of ectoparasites in which infection was found by mass inoculation were principally fleas, but infection was found in a pool of lice in one case and a number of pools of fleas also included ticks and lice.

A lengthy table sets out in detail the number of pools of ectoparasites and of rodents found to be infected in the counties of the six States concerned on various dates during the year. [Infections reported in 1946 are discussed in the abstract quoted above.] *H. J. O'D. Burke-Gaffney*

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

NEAL, R. A. *Entamoeba histolytica* **in Wild Rats caught in London.** *J. Hygiene.* 1948, Mar., v. 46, No. 1, 90–93, 1 text fig. & 2 figs. on 1 pl. [11 refs.]

Nautral infections of rats with *Entamoeba histolytica* have been reported on several occasions from different parts of the world, but this is the first record of its occurrence in rats of England. These spontaneous infections are of some epidemiological importance, since it is conceivable that wild rats might act as reservoir hosts of human amoebiasis. The author describes the finding of an amoebic infection in seven out of eleven wild rats caught in a London house, among the inhabitants of which were two Cypriots passing abundant cysts of *E. histolytica* in their stools. It was also shown that the trap between the sewers and the drainage system of the house in question was absent, thus enabling the rats to gain access to the house. From these facts it would seem that the infection was acquired by the rats from cysts of a human strain of *E. histolytica*. The active forms of the amoeba were identical with *E. histolytica*; cysts were scanty and represented by immature forms, but in culture typical quadrinucleate cysts developed. Infection in the wild rats was restricted to the caecum, in which no lesions were detected. However, when cultures of amoebae isolated from wild rats were inoculated intracaecally into newly-weaned white rats they invaded the caecal wall, producing ulceration. The amoebae ingested tissue fragments, bacteria and red blood corpuscles. The infection in the experimental animals was successfully treated with emetine hydrochloride administered at a dilution of 0·002 per cent. in the diet.

The paper is illustrated by figures of the trophic amoebae and their cysts, and by photomicrographs of sections of the caecal lesions. *C. A. Hoare*

MILLER, M. J. & CHOQUETTE, L. P. E. **Studies on Amoebiasis in Canada. Part I. The Incidence of Intestinal Protozoal Infections in Two Institutionalized Groups in Canada.** *Canadian J. Res.* Sect. E. Med. Sci. 1947, Feb., v. 25, No. 1, 1–4.

In a previous survey of 47 orphanage children in Saskatchewan, the senior author [this *Bulletin*, 1940, v. 37, 113] found *Entamoeba histolytica* in the stools of 23 per cent. on a single examination, despite a low local clinical incidence of the disease.

In order to pursue this subject in Canada, the present authors studied subjects from two institutions in Montreal, namely (1) an orphanage of 163 boys, aged 8 to 10 and (2) an Old Men's Home, with 151 persons aged 32 to 95 (average 50 to 70 years). Orthodox methods of examinations were employed.

In group (1) 158 or 97 per cent. of the boys and in group (2) 107 or 71 per cent. of the men harboured one or more species of intestinal protozoa. The detailed percentage results were as follows :—

	Boys	Men
E. histolytica	37·0	20·5
E. coli	87·0	37·0
E. nana	69·5	52·0
I. bütschlii	3·5	2·5
G. lamblia	49·0	6·0
C. mesnili	7·0	0

The cysts of *E. histolytica* found were classified into the large and small races as defined by SAPERO *et al.* [this *Bulletin*, 1943, v. 40, 53] with the following percentages of each :—

	Boys	Men
Large race	26·5	8·5
Small race	17·5	13·0
Large and small race	5·5	1·0

Despite the limited numbers in the groups examined, the results tend to confirm the previous Saskatchewan findings that intestinal protozoa are common in persons in institutions in Canada. The authors state that the results "add further support to the frequently demonstrated but still largely unrecognized fact that the intensity of *E. histolytica* infections is mainly dependent on the sanitary standards of a people and not related to their geographic locale".

The groups were comparable except in age, but the extremes of age tended to make their sanitary levels similar. Almost all the subjects had been born in Quebec.

It will be noted that the incidence, intensity and multiplicity of all the parasites was greatest in the boys. A further point of interest is that *Giardia* was common in the boys and rare in the older men ; and while *E. coli* was commoner than *E. nana* in the former the reverse was true in the latter.

The incidence of the small race of *E. histolytica* was high : indeed in the older group, it was commoner than that of the large race. The authors discuss this incidence and suggest that although the small race is generally assigned a relatively minor rôle as a cause of amoebiasis, its pathogenic status requires to be determined definitely by further studies, both because of its relative frequency and because of the difficulty of distinguishing it from *Endolimax nana* in fresh smears. [See also this *Bulletin*, 1947, v. 44, 999 ; *ibid.*, 1948, v. 45, 517.] *H. J. O'D. Burke-Gaffney*

GHOSH, S. K. **Appendicitis due to** *Entamoeba histolytica*. *Indian Med. Gaz.* 1948, Apr., v. 83, No. 4, 185–6.

TERRY, L. L. & BOZICEVICH, J. **The Importance of the Complement Fixation Test in Amebic Hepatitis and Liver Abscess.** *Southern. Med. J.* 1948, Aug., v. 41, No. 8, 691–702, 9 figs. [10 refs.]

An early diagnosis of amoebic hepatitis or of amoebic liver abscess is difficult, even if its presence is suspected. By the time gross physical signs, such as diaphragmatic deformity, develop the lesions are well advanced and the

damage extensive. From collected reports, OCHSNER and DEBAKEY [this *Bulletin*, 1943, v. 40, 915] recorded that in only 474 (11·6 per cent.) of 4,091 cases of amoebic liver infection has the presence of a gut infection with *Entamoeba histolytica* been proven. A satisfactory complement-deviation test would therefore be of great value in questionable cases of amoebiasis, especially in those with liver involvement. The difficulty in this test lies in the lack of a potent antigen.

For some years, a group in the Division of Tropical Diseases of the National Institute of Health, U.S.A., has been examining the complement-deviation test for amoebiasis. In conjunction with this study, the Medical Service of the U.S. Marine Hospital, Baltimore, has made clinical applications of the test. The present paper is concerned with these.

Fifteen cases of amoebic hepatitis or liver abscess were thoroughly investigated between 1943 and 1947. The patients were males, aged between 17 and 64 years, of various races and nationalities. According to KLATSKIN's classification [*Ann. Intern. Med.*, 1946, v. 25, 601] there were 6 patients with acute and 2 with chronic hepatitis ; and 5 with acute and 2 with chronic abscesses. A complement-deviation test was performed on each of these by staff at the N.I.H., who were unaware of the clinical diagnosis. The antigen used was obtained by placing an inoculum of amoebae in a dialysing tube in a coagulated egg-white medium covered with Locke's solution fortified with vitamins. After incubation at 37°C. for 144 hours, the contents of the tubes were pooled ; merthiolate, 1/1,000, was added ; and the mixture was refrigerated at 50°C. for 3 days. It was then centrifuged for 15 minutes at 20,000 r.p.m. ; the supernatant fluid was removed and dialysed in tap water, and then in 3 changes of distilled water. The contents of the dialysing tube were evaporated before a fan to about one-fifth their volume before dialysis ; the concentrate was again centrifuged at 20,000 for 15 minutes ; and the residue was discarded. The supernatant fluid was again merthiolated after being made isotonic with sodium chloride.

Stool examinations were done on 14 of the 15 cases ; and of the 14 only 3 were found to contain *E. histolytica* before treatment. Three more were subsequently found to harbour parasites in the gut. In the case of 2 patients the complement-deviation test was not done until some time after specific treatment had been given ; one of these gave a positive test, the other a negative. In the remaining 13 cases the test was performed before treatment ; 10 gave consistently positive reactions ; 2 gave initially negative (false negative) reactions, but on repetition within a few days the test had become positive ; one gave a negative reaction on the only occasion the test was done prior to treatment. It was found that the antigen used in each of these 3 cases where negative readings were obtained was lacking in antigenic potency. All 3 cases at subsequent dates gave positive reactions, although re-examination of the same serum of one of them with a potent antigen continued to give a negative result. There was no record in the hospital of a false positive test. [No mention is made of the number of controls examined.] It has not been determined how long after successful treatment of an amoebic liver abscess a positive complement-deviation test persists. In some cases there is a reversal within 1 to 3 weeks ; in one case the test remained positive for 2 years, and the patient was clinically well for a period of at least 3 years.

[In the reviewer's opinion the percentage of proven intestinal infections with *Entamoeba histolytica* in the cases referred to in this paper, and in the literature cited, indicates a lack of experience and skill in their detection. As the authors indicate " there has been disagreement among experts as to identification of ameba even when examining the same slide," an observation which reinforces the above comment.] *A. R. D. Adams*

DRAKE, E. H. & WARTHIN, T. A. **Amebic Abscess of the Liver. Therapeutic Problems in various Types of Late Hepatic Amebiasis.** *New England J. of Med.* 1948, July 8, v. 239, No. 2, 45-9.

Six cases of late amoebiasis of the liver are described. None had previously been diagnosed as being infected with *E. histolytica*. The onset was usually acute with signs referable to the liver.

The clinical material is divided into three groups : simple amoebic hepatitis ; a large liver abscess remaining localized, and a large abscess which had penetrated through the diaphragm. Only one was classified as diffuse hepatitis and was treated by chemotherapy alone.

Two had abscesses of significant size that had not drained into the pleural or peritoneal cavities. These were treated by chemotherapy and aspiration. After the institution of emetine therapy, an incision was made in the abdominal wall to permit, under direct vision, the introduction into the abscess of a large aspirating needle. This aspiration was followed by the instillation of penicillin into the abscess cavity and closure of the abdominal wall without drainage. The two abscesses which had penetrated through the diaphragm were secondarily infected and these were treated by open drainage. In the sixth case, the abscess had drained spontaneously into the right pleural cavity and through the bronchial tree. The patient was treated by chemotherapy and aspiration of the empyema fluid by thoracentesis.

All were treated by intramuscular emetine in a single dose of 1 grain daily for eight days and by two subsequent courses, each of six days' duration. At the termination of each emetine course, vioform was given by the mouth, commencing with 4 grains three times daily, increasing to 15 grains three times daily for 10 days. Penicillin was injected intramuscularly in doses from 30,000 to 50,000 units every three hours.

Some evidence was obtained by studies *in vitro* in the fifth case that development of resistance to emetine may take place. Amoebae from this patient grew in concentrations of emetine which were much higher than the control strains tested, indicating drug resistance.

Vioform was found to be satisfactory for eradication of *E. histolytica* cysts.

The onset of symptoms referable to the abscess were often acute and without premonitory symptoms. In the second case, the physical signs suggested acute cholecystitis. The white-cell count varied from normal to marked elevation. Examination of the faeces was positive in three out of the six. After spontaneous drainage by hepatobronchial fistula the sputum was found to contain trophozoites of *E. histolytica* in two cases, while the exudate from abscess cavities with inadequate drainage contained large numbers of motile trophozoites.

P. Manson-Bahr

CROSNIER, R., MERLE, BERNIER, MOLINIER & TABUSSE. Traitement de la dysenterie amibienne par les extraits d'"holarrhena floribunda". [**Treatment of Amoebic Dysentery with Extracts of** *H. floribunda*.] *Bull. Acad. Nat. Méd.* 1948, v. 132, Nos. 19/20, 336–8.

The alkaloids of *Holarrhena floribunda* act specifically on the dysenteric amoebae and cysts. To thirteen patients with acute amoebic dysentery were given the total alkaloids of the plant ; from 9 the amoebae disappeared, in 4 cases there was improvement. Similar treatment of 6 patients with cysts in the stools led to the disappearance of the cysts.

Thirteen other patients with acute amoebic dysentery were treated with conessine hydrochloride. One of these did not complete the course, owing to

intolerance of the drug ; the remainder were cured by the treatment. Conessine hydrobromide appeared to be as efficient, and to be free from toxicity.

A. R. D. Adams

PIEKARSKI, G. Zur Frage der Cystenbildung bei *Dientamoeba fragilis*. [**Encystation in** *Dientamoeba fragilis*.] *Ztschr. f. Hyg. u. Infektionskr.* 1948, Apr. 1, v. 127, Nos. 6/8, 496–500, 7 figs.

The author has re-discovered, in the stools of an inmate of an institution, cyst-like structures corresponding to the so-called " Bosman-cysts " previously described by BRUG [this *Bulletin*, 1937, v. 34, 514]. While Brug left the question regarding the identity of these bodies open, the present author regards them as cysts of *Dientamoeba fragilis*. Subsequent examinations of stools of 133 other persons revealed in eleven cases the presence of the same structures in association with the amoeboid forms of *Dientamoeba*, while in 32 cases only the amoebae and in 21 only the " cysts " were found.

The cysts are rounded or ovoid, measuring 4–9$\mu \times$4–6μ. When stained with iron haematoxylin a distinct cyst-wall is seen around the enclosed body, which is detached from the wall and contains two dark-staining granular structures. Though these do not always show the characteristic structure of the nuclei of *Dientamoeba*, their nuclear nature was revealed by Feulgen's reaction. In addition there were a number of " chromidial bodies " [=chromatoids]. The author claims to have seen all transitions from the " vegetative cells " of *Dientamoeba fragilis* to these cyst-like bodies, which left no doubt in his mind that they belonged to the same parasite. The appearance of these cysts is shown in a series of figures. He was unable to undertake any further investigations—by experimental infections and cultivation—on the nature of these cysts.

C. A. Hoare

COSTA, R. S. Dientamoeba fragilis : Jepps y Dobell, 1918. Primeros casos señalados en nuestro país. Consideraciones epidemiológicas. [*Dientamoeba fragilis*. **The First Cases recorded in Cuba.**] *Rev. Kuba Med. Trop. y Parasit.* 1948, June, v. 4, No. 6, 115–18. [24 refs.]

In 1941 the author heard of certain skin diseases associated with, and thought to be due to, intestinal parasites. He, therefore, has looked for these in patients coming for treatment of exudative or desquamating eczema, prurigo, urticaria and other skin affections allergic in nature. Eighty-two patients with these dermatoses have been examined and 52 of them had intestinal protozoal parasites. Among 76 patients whose faeces contained protozoa, 4 of the author's patients and one sent in by another practitioner were passing *Dientamoeba fragilis*. The fifth was a child of 7 years, with entero-colitis whose faeces contained also *Entamoeba coli* and *Giardia intestinalis*. Case 1 was in a man of 41, with eczema of hands, face and neck which had troubled him for about 20 years ; he had *D. fragilis*, *E. coli*, *Endolimax nana* and *Chilomastix mesnili*. He was given Enterovioform, 3 tablets daily, to a total of 40 tablets. The symptoms cleared up, but a couple of months later they returned and *D. fragilis* was again found. Case 2 was a man of 27, with generalized eczema and prurigo for 2½ years and had *D. fragilis* in his stools. He, too, was given Enterovioform ; improvement was rapid and the cutaneous lesions disappeared. He was not seen again. Case 3, a man of 53 years, with pruritus ani for 5 years ; *D. fragilis* was abundant. He was given Carbantren and slight improvement took place. Case 4, a man of 18, with generalized scaly eczema, especially on face and hands ; 7 years' duration. *D. fragilis* very numerous. He was treated with Carbantren, 3 tablets daily for 10 days, repeated after an interval of 8 days. The skin condition was cured and there had been no return when he was seen again nearly four months later.

H. Harold Scott

Filho, E. S. & Castro, E. L. Patogenia e quadro clínico da giardíase. [**Pathogeny and Clinical Picture of Giardiasis.**] *Rev. Brasileira Med.* Rio de Janeiro. 1948, Jan., v. 5, No. 1, 12–15. [Bibliography.] English summary.

After noting the opinions of many authors regarding the question of the pathogenicity or mere simultaneous presence of *G. intestinalis*, *i.e.* whether symptoms accompanying the presence of the protozoon are aetiologically connected, the authors record the facts in 15 patients under their observation. The chief subjective complaints were of epigastric pain, nausea, especially in the morning, pyrosis, dyspepsia, bitter taste in the mouth, diarrhoea alternating with constipation, flatulence and headache—symptoms somewhat vague and indeterminate. They believe that the presence of the parasite in the gall-bladder or bile causes spasm of the sphincter and stasis of the bile and some degree of inflammation of the bladder wall. They conclude, therefore, that *G. intestinalis* has a definite pathogenic action, even though a mild one. Treatment by atebrin, 0·1 gm. thrice daily for 5 days, proved quite satisfactory.

H. Harold Scott

Herrlich, A. & Liebmann, H. Die menschliche Coccidiose. (Weiterer Beitrag zur Kenntnis der menschlichen Coccidien.) [**Human Coccidiosis. (Further Contribution to the Knowledge of Human Coccidia).**] *Ztschr. f. Hyg. u. Infektionskr.* 1944, Nov. 12, v. 126, Nos. 1/2, 220–36, 6 figs.

This is a continuation of the authors' previous work on human coccidiosis [this *Bulletin*, 1944, v. 41, 782]. In the present paper, they report the results of an experimental study, the main objects of which were to determine the clinical manifestations of the infection and the host-specificity of *Isospora belli*. An exceptionally heavy infection in a patient (about 10 oöcysts per microscopic field in faecal smears) enabled them to carry out experimental infections in man and lower animals. The oöcysts were allowed to mature in an incubator at 37°C., after which (30 hours later) they were diluted in water and introduced into the stomach of volunteers by means of a catheter, each receiving about 20 cc. of the suspension containing about 100,000 oöcysts. The total number of volunteers was ten, 5 of whom were inoculated with the suspension, 2 with centrifuged oöcysts, and 1 with immature oöcysts, while 2 others, serving as controls, received 20 cc. of the filtrate from the infective material. The persons to whom ripe oöcysts were given started passing immature oöcysts in the stools between the 9th and 16th days after infection, their discharge ending after 21 days, but those who received centrifuged or immature oöcysts failed to acquire an infection. It was thus confirmed that *I. belli* undergoes a definite cycle of development in the human intestine. The infections produced symptoms of acute enterocolitis which subsided when the oöcysts were discharged in the stools. Human coccidiosis is therefore a self-limited disease. Attempts to infect young kittens, pups, mice, guineapigs and rabbits were unsuccessful. It is concluded that *I. belli* cannot be regarded as a variant of the *bigemina-rivolta* group of *Isospora* of cats and dogs, but is a parasite specific to man, though the existence of some unknown animal reservoir cannot be excluded.

C. A. Hoare

See also p. 1119, Casis Sacre, **Impresiones parasitológicas a través del Seguro Social Mexicano.**

Craig, Charles Franklin. **Laboratory Diagnosis of Protozoan Diseases.**

This book is reviewed on p. 1133.

YAWS

APTED, I., HARDING, R. D. & GOSDEN, M. **A Clinical and Serological Follow-up of Yaws Cases treated by Acetylarsan and Bismuth Sodium Potassium Tartrate.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1948, July, v. 42, No. 1, 55–64.

This paper reports observations in eastern Sierra Leone on the cure rates following administration of acetylarsan and bismuth sodium potassium tartrate (BSPT) alone and in combination in two areas about 70 miles apart.

In the first area observations were made at the same intervals after treatment with one or both of the drugs, in those patients who showed the worst yaws lesions in a community which had enjoyed facilities for treatment for some years. Kahn and modified Ide tests were used, but the latter were found unsatisfactory in following the results of treatment. The patients treated were suffering from secondary yaws, predominantly non-infectious plantar lesions.

After 6 doses of acetylarsan 4 cc. [0·94 gm. diethylamine acetarsol], 61 per cent. of cases had no lesions and the serum from 50 per cent. gave weak (15) doubtful (15) or negative (21) Kahn reactions. After 3 doses of acetylarsan 3 cc. and 4 doses of BSPT 3 grains [0·18 gm.] 49 per cent. had no lesions and only 21 per cent. had weak (4), doubtful (11) or negative (7) Kahn reactions. After 6 doses of BSPT 4 grains [0·25 gm.] no lesions were found in 32 per cent. and 9 per cent. had infectious relapses and the Kahn results were weak (2), doubtful (4) or negative (7) in only 13 per cent. All observations were made 6–7 months after treatment, injections were given at intervals of one week and the numbers of patients in individual groups ranged from 28 to 120. Sera from 37 of these cases were examined 12 months after treatment, when only 2 were weak or doubtful and 5 negative; the rest were positive. Six months previously the same patients had shown 11 weak and 5 negative. Thus it was seen that although acetylarsan was moderately effective, the particular BSPT preparation used was of limited value either alone or with acetylarsan. The marked seasonal variations in incidence of yaws lesions complicated the full assessment of therapeutic effect.

In the second area observations were made at varying intervals after standard courses of acetylarsan and BSPT together. All patients with definite signs of yaws were treated from a community where previously treatment was not so readily available. Tertiary yaws cases were omitted from this study. Clinical examinations were made at intervals of 6, 12 and 24 months and Kahn tests were carried out at 6, 18 and 30 months. The doses of acetylarsan were reduced from 5 cc. [1·18 gm. diethylamine acetarsol] to 4 cc. [0·94 gm.] and later 3 cc. [0·71 gm.] because of toxic reactions, and the dosage of BSPT was 3 or 4 grains [0·18 or 0·25 gm.]. Both drugs were given on the same day, intramuscularly, and repeated at intervals of 5 days, usually 4 pairs of injections were given.

The passage of time made little difference in the clinical or serological findings. Of patients with infectious yaws 70, 64 and 76 per cent. had no lesions after 6, 12 and 24 months, and 52, 58 and 71 per cent. had weak, doubtful or negative Kahn reactions after 6, 18 and 30 months. Of patients with non-infectious yaws, 58, 34 and 45 per cent. had no lesions and 69, 72 and 69 per cent. had weak or negative Kahn tests after the same time intervals. The numbers in the groups ranged from 27 to 154; larger doses of drugs had been received by patients followed for the longer times.

The authors stress the importance of frequently repeated observation in assessing the clinical relapse rate. They conclude that acetylarsan in the doses used will banish the more marked signs of yaws for at least 2½ years and will

perhaps permanently cure one-third of cases (secondary) and that it will render most of the remainder quiescent for an indefinite though prolonged period. In later work they have replaced BSPT by bismuth salicylate in oil, with striking improvement in immediate results. Further data on this are to be published later.

[This paper is the result of much field work and analysis. The reviewer feels that fuller knowledge of secondary and tertiary plantar and palmar yaws lesions, at present non-existent, will remove the necessity of using such unsatisfactory terms as " active ", " inactive ", " infectious " and " non-infectious ", each of which comprised a group of lesions with no certainty that the " inactive " and " non-infectious " groups do not include both secondary and tertiary lesions. Since the publication of this paper HARDING has found that the bismuth content of the BSPT used was only about 4·5 per cent. while that of bismuth salicylate (B.P.) is about 60 per cent.] *C. J. Hackett*

LEPROSY

VIEIRA BRAGA, R. Contribuição ao estudo da lepra no meio industrial do Distrito Federal. [**Leprosy in Industry in the Federal District (Brazil).**] *Rev. Brasileira Med.* Rio de Janeiro. 1948, Apr., v. 5, No. 4, 258–60, 6 graphs.

During the nine-year period, 1 August 1938–31 July 1947, among 66,764 patients examined at the Industrial Institute, 3,006 were suffering from skin diseases and 231 from leprosy, *i.e.*, 7 per cent. of the total examined were skin affections and 0·35 per cent. were leprosy. The numbers varied considerably from year to year ; 20 only in 1941, 39 (a peak number) in 1944. Of the total, 98 were suffering with the mixed type, 93 with the neural and 40 with the lepromatous type. By far the greater proportion were males, but this has little significance as male employees far exceed the females ; the majority were between 20 and 40 years of age and the figure was higher in the third decade than in the fourth. As regards trades, most of the cases were among tailors, bakers and seamstresses [infection from clothes ?]. Those engaged in these occupations should be repeatedly and periodically examined.

H. Harold Scott

VALLE, S. Diagnóstico precoce da lepra. Parte I, II & III. [**Early Diagnosis of Leprosy.**] *Rev. Brasileira Med.* Rio de Janeiro. 1948, Apr., May & June, v. 5, Nos. 4, 5 & 6, 288–95 ; 377–87 ; 444–54, 36 figs. (11 coloured). [Bibliography.]

This article contains a good general account of leprosy in its various aspects. It is not easy to see, however, why the title is " early diagnosis ", for later stages of the disease are included short of actual mutilation. The following indications of the disease are each discussed in turn : the anaesthesia and its usual distribution, the neuritis and neuralgias, the wasting of muscles, particularly those served by the median, the external popliteal, the facial and the supraorbital nerves. The ocular lesions are fully described, with excellent reproductions in colour ; next, the affections of the nasal mucosa and clinical tests, the histamine and pilocarpine tests and the diagnostic differences between lepra and syringomyelia, examination for the bacteria, the Mitsuda reaction, the chief features of the lepromatous, the tuberculoid and the " non-characteristic " forms, and

ending with remarks on other forms of localized anaesthesia, maculae, and nodule formations, carcinoma, sarcoma, sarcoid, yaws and others.

H. Harold Scott

DA VEIGA, S. As lesões osteo-articulares da lepra através das imagens radiográficas. [**Bone and Joint Lesions in Leprosy, with Radiographic Illustrations.**] *An. Inst. Med. Trop.* Lisbon. 1947, Dec., v. 4, 149–60, 24 figs. on 12 pls. English summary.

The author took 400 radiograms of the hands and feet of 100 leprosy patients in the Central Leprosarium of Goa. Fifty-eight were males, 42 were females, between the ages of 12 and 67 years, the numbers in successive decades being 5, 17, 27, 28, 17 and 6. The duration of the disease ranged up to 5 years in 23 patients; 6–10 years in 37; 11–15 years in 13; 16–20 years in 10; 21–28 years in 9; in the remaining 8 the duration was not known.

The author divides his patients into 5 groups: (i) Those with cutaneous lesions only (7 in number); (ii) with marked cutaneous and slight nerve manifestations (18); (iii) purely nerve cases (42); (iv) with marked nerve and slight skin affection (11); (v) with nerve and cutaneous lesions about equal (22). The diagnosis had to be made between leprosy on the one hand and, on the other, tuberculous or syphilitic osteitis, sclerodactylia, sclerodermia, Besnier-Boeck disease, syringomyelia and tabes.

The pathological process was chiefly destructive, rarefying osteitis and osteoporosis, with cyst-like formation and more extensive destruction resulting in mutilation. Some of these, in particular the osteoporotic changes, would seem to be due primarily to vascular disturbance, whereas those changes involving the joints as well as the bones result from leprotic nerve involvement. Hence the oseto-articular lesions are most common in those with the nervous form of the disease and were more marked in the feet than in the hands. [The article is illustrated with 24 excellent radiographic reproductions and more can be learnt from a study of these than from any abstract or even pages of letterpress.]

H. Harold Scott

MONTEL, M. L. R. Deux cas de réactions lépreuses, aiguës, fébriles traités respectivement par le bleu de méthylène et l'émétique. [**Two Cases of Acute Febrile Lepra Reaction treated respectively with Methylene Blue and Tartar Emetic.**] *Bull. Soc. Path. Exot.* 1948, v. 41, Nos. 5/6, 312–18, 2 charts.

FONTE, J. & ROSSELL, C. S. C. Contribuição ao tratamento da lepra pelo "promin". Controle dos doentes pela pesquisa do bacilo no sangue. [**Treatment of Leprosy by Promin. Control of Cases by Examination for Bacillaemia.**] *Brasil-Medico.* 1948, Apr. 17 & 24, v. 62, Nos. 16–17, 170–76.

The authors treated 8 cases of the lepromatous type of leprosy with Promin. All had bacilli in the nasal mucus, in specimens from the skin scarifications and in samples of blood. Three methods of blood examination were used, that of Crow, of Rivas, and of Gomes de Faria; all cases were positive with the last but not all with the other two. Of the 8 patients 7 were males, 1 was a female; their ages ranged from 19 to 45 years and the number of injections given was up to 240, in series of 10–18 injections; the average dose about 4 gm. (3·8–4·4). Slight exacerbation of symptoms succeeded the beginning of treatment—focal reactions or nodular erythema—but this disappeared with further treatment. The nodules softened, nasal obstruction and coryza disappeared, the erythematous patches were clearing and weight increased. Nervous symptoms

remained unchanged. In other respects there was no change ; bacteria were still present in the nasal mucus, the skin, the blood, and the Mitsuda reaction (negative in all but one) remained the same. The bacteria, however, though present, were more fragmented and less acid-fast. Details are given of each of the eight treated. *H. Harold Scott*

PICCARDI, G. & RADAELI, G. Sulla ricerca e sul comportamento dei composti di Molibdeno negli organi leprosi. [**On the Behaviour of Molybdenum Compounds in Leprous Tissues.**] *Spectrochimica Acta.* 1948, v. 3, No. 2, 233–4, 1 fig.

That methylene blue injected into the living body stains the tissues and organs attacked by *Myco. leprae* and electively the bacteria themselves is well known. It is also known that ammonium molybdate and methylene blue in solution when added together produce a dark blue solid. Hence there arose the idea of localizing, as it were, the molybdate in the affected tissues by means of the methylene blue and obtaining thereby a more energetic action of the drug. The following researches were carried out : (1) A leprous nodule, stained with methylene blue, in a young patient, was extirpated and divided into two. One part was immersed for a certain time [not stated] in a solution of Am. molybdate, the other not. When subsequently immersed in 95 per cent. alcohol the latter was rapidly decolourized, the former retained the colour, confirming the fixing action of the molybdenum. (2) The patient, who had many lepromata, some of which were stained with methylene blue, was given a series of intravenous injections of 1 per cent. Am. molybdate. Five days after the course ended, two nodules were extirpated, one which had been stained, and one which had not and was of the normal red colour. The nodules after treatment with fuming nitric acid gave place to an oily residue. Examined spectroscopically, in the UV area, the lines of molybdenum were plain in both the nodules and to about the same degree in both. (3) In order to demonstrate the fixation of molybdenum in the nodule stained with the methylene blue, 5 months after the course of treatment, two more nodules, one blue and one unstained, were extirpated from the same patient and the same procedure carried out. No traces of molybdenum could be found on spectroscopic examination. It had been completely eliminated, indicating that the methylene blue had not the effect of fixing the molybdenum. *H. Harold Scott*

DE SOUZA-ARAUJO, Heraclides-Cesar. **História da Lepra no Brasil. Vol. II.**
This book is reviewed on p. 1132.

KEFFER, Luiza. **Indice Bibliográfico de lepra 1500–1945. Vols. I, II & III.**
This book is reviewed on p. 1133.

HELMINTHIASIS

DE MEIRA, M. T. V., NOGUEIRA, J. F. P. & SIMÕES, T. S. Contribuição para o estudo do parasitismo intestinal nas Ilhas do Sal, Boa Vista e S. Nicolau (Cabo Verde). [**Intestinal Parasitism in the Islands of Sal, Boa Vista, and S. Nicolau (Cape Verde).**] *An. Inst. Med. Trop.* Lisbon. 1947, Dec., v. 4, 239–56. English summary (10 lines).

[This study is of more than local interest because there is inter-communication between the islands of the archipelago and there is to be an aerodrome established

on the island of Sal.] There is no statement of the population of these islands and the numbers examined—by the Willis technique—were small, and this fact should be borne in mind in interpeting the findings.

In S. Nicolau, 117 individuals were examined from 24 localities [in 9 of these only one was examined] and 92 (78·6 per cent.) were passing hookworm ova, and 87 of these other ova also, 44 of them *Ascaris* and *Trichuris*. Blood examination revealed but little anaemia, whether the patients had hookworm alone, or with other helminths, or the latter without hookworms. The average number of red cells was 3¼ to 3½ million per cmm. (in those without parasites 3,630,000), haemoglobin about 50 per cent. (in the non-parasitized 67·7 per cent.); eosinophiles ranged up to 29 per cent., with an average of 8·2 in those with ankylostomes only, 11·4 in those with other helminthic infestations also; an average of 9 in those with helminths other than ankylostome. Those without any intestinal parasites had an eosinophilia of 7–11 per cent. average 10 [no reason is offered in explanation of this]. Of 125 who had never left the island 94 were infested (75·2 per cent.) most (59) with *Ascaris*, next (17), with *Trichuris*.

Specimens of blood were examined also for filariasis; 100 were taken in the daytime and 84 between 9 p.m. and midnight. Embryos of *Acanthocheilonema perstans* were seen in 5 of each (day or night specimens) and in four cases in both.

In the island of Sal 278 individuals were examined for intestinal infestations and 83 (30 per cent.) were positive; 19 showed *Ascaris* ova, 10 *Trichuris*; there was none with hookworms; 36 showed *Entamoeba histolytica* and 15 *Giardia intestinalis*.

In Boa Vista, only 85 were examined; 28 were positive, 10 with *Ascaris*, 11 with *E. histolytica*, 7 with *G. intestinalis*; again here ankylostomes were not found. *H. Harold Scott*

See also p. 1120, Taliaferro, **The Inhibition of Reproduction of Parasites by Immune Factors.**

See also p. 1119, Casis Sacre, **Impresiones parasitologicas a traves del Seguro Social Mexicano.**

Talaat, S. M. **Renal Concentration Test in Urinary Schistosomiasis and the Effect of Tartar-Emetic on it.** *J. Roy. Egyptian Med. Ass.* 1948, June, v. 31, No. 6, 481-6.

The ability to concentrate the urine is usually the first function to fail in renal disease. The "posterior pituitary test" for this consists of the administration of 10 units of posterior pituitary extract subcutaneously, after the patient has emptied his bladder, and a record of the blood pressure at 5, 10, 15 and 30 minutes, and of the specific gravity of the urine at hourly intervals for 3 hours, after the injection, 1,020 being taken as normal.

Of 15 apparently normal individuals only one failed to concentrate urine to an S.G. of 1020. Of 24 cases of pure urinary schistosomiasis (*i.e.* abnormality confined to the urinary tract), examined both before and after treatment with tartar emetic, 4 failed to concentrate the urine adequately. Tartar emetic treatment, it is considered, did not impair the kidney concentration power; indeed in one case the power of concentration after treatment was found adequate where previously it had been deficient. Kidney function is impaired in urinary schistosomiasis, the incidence being thrice that found in controls by the posterior pituitary test. [The data supplied in the text and the tables are unconvincing.] *A. R. D. Adams*

BLAIR, D. M. & ROSS, W. F. **Observations on the Use of Cercarial Antigen in the Diagnosis of Schistosomiasis.** *Ann. Trop. Med. & Parasit.* 1948, Apr., v. 42, No. 1, 46–51, 1 graph.

The authors describe two methods of making antigens from cercariae for the diagnosis of schistosomiasis. OLIVER GONZÁLEZ and PRATT [this *Bulletin*, 1946, v. 43, 348] and KATZIN and MOST [*ibid.*, 1947, v. 44, 440] made an antigen from cercariae shed by snails infected with *Schistosoma mansoni*. The cercariae were stored as a dried powder after having been centrifuged down. The liquid antigen was made from this powder by a 1 : 5,000 dilution with 0·5 per cent. carbol-saline. ALVES and BLAIR [this *Bulletin*, 1946, v. 43, 344 ; 1947, v. 44, 826, 827] made another antigen from mammalian cercariae presumed to be those of *S. haematobium*, shed by naturally infected *Physopsis africana*. Water from a pond in which the snails were kept was poured through filter paper to trap the cercariae, a rough estimate of the number of cercariae (usually 12,000 to 15,000) trapped on each filter paper being made. The antigen was stored on those filter papers. Liquid antigen was made by macerating the filter papers in 1 per cent. carbol-saline for 48 hours, 1 cc. of carbol-saline being allowed per 2,000 cercariae, the fluid being "finally espressed" and diluted with an equal part of normal saline. The final concentration of antigen works out at the products of 1,000 cercariae per cc. The dose given for each skin test is "about 0·03 c.cm.", which equals the products of 33 cercariae.

CAWSTON has objected that, when "wild" snails are used, the exact species of the cercariae is not known. The present authors do not claim that all the cercariae used were those of *S. haematobium* and maintain that no claim has ever been made that antigens made from cercariae are species-specific. Oliver González and Pratt (*loc. cit.*) used antigen from *S. mansoni* to diagnose infections with *S. japonica*. They recommended that the initial weal produced should have a diameter of 4 mm. and consider as positive a weal the diameter of which has doubled to over 8 mm.

Discussing this question, the present authors give a table showing the diameters of weals shown by 39 positive reactors and 36 negative patients at intervals of 5 minutes up to 25 minutes after the injections. The positive group consisted of 1 European, 17 Eur-African children and 21 African school children ; 22 of these were infected with *S. haematobium*, 3 with *S. mansoni*, 6 with both these species and 8 were passing no eggs. The negative group consisted of 2 Europeans, 1 adult African and 33 African school children. In each of the subjects a control weal was produced with carbol-saline.

The table shows that the antigen weals increased in size in all the positive reactors in comparison with the control weals up to a maximum reached in 15 to 20 minutes after the injections ; in the negative group the antigen and control weals showed little or no increase in size. The authors emphasize that the optimum time for measuring the weals is 15 minutes after the injection. Only a few of their subjects showed doubtful reactions, *i.e.* weals whose diameters increased only to one and three quarters or twice the size of the initial weal. The authors used confetti paper discs with a diameter of 6 mm. as aids to measurement and a series of ciné photographs of the development of the weals of one subject was projected on to squared paper so that the sizes of the weals could be measured and expressed in the graph reproduced in their paper.

Comparison of weals produced by stocks of 5 old antigens, of which the 2 oldest were made in 1938 and 1945, the others being about a year old, showed no significant difference in the reactions produced by these different antigens. The authors advocate the use of control injections for individual diagnosis, especially in Europeans, but they consider that controls are not necessary when

Africans are being tested in mass, because skin allergy is believed to be rare in African subjects, if it occurs at all. *G. Lapage*

Martinez-Villafañe, H. & Lang, A. A. **The Treatment of Schistosomiasis Mansoni with Neostibosan. Preliminary Report.** *Bol. Asoc. Med. de Puerto Rico.* 1948, June, v. 40, No. 6, 128–30.

The authors treated 25 adult males suffering from *Schistosoma mansoni* infections with Neostibosan. The drug was given intravenously daily for three days (50, 100 and 200 mgm. respectively) and then in doses of 300 mgm. on alternate days to a total of 8·45 gm. In only one case was the treatment discontinued because of untoward reaction (a total of 4·25 gm. had been given). Reactions in two other cases were controlled by the antihistaminic drug Pyribenzamine.

Immediately after treatment, 7 patients showed " live " ova either in stools or rectal biopsy ; 10 showed dead eggs in the biopsy, but none in the stools and 8 had no ova showing in either.

In follow-up studies of 13 cases from one to seven months after treatment, 9 showed positive stools within five months : but the follow-up is not yet complete. The author believes that the number of failures will be found to be higher and concludes that Neostibosan has not sufficient parasitotropic effects to warrant its use in the treatment of *S. mansoni* infections.

In a discussion, Rodriguez-Molina briefly reviews the therapeutics of schistosomiasis. He emphasizes that in evaluating the results of therapy, false negative stool results may be found in the first month after treatment, probably because of " a temporary inhibitory action on the ovipositing females " on the part of the drug. Stool examination should therefore not be made until a month has passed. *H. J. O'D. Burke-Gaffney*

Blair, D. M. **Schistosomiasis in Southern Rhodesia. Public Health Aspects.** *South African Med. J.* 1948, July 24, v. 22, No. 14, 462–7. [12 refs.]

In Southern Rhodesia schistosomiasis has been reported since 1914, and since then there has been abundant proof that infection is widespread in the country. Both *Schistosoma haematobium* and *S. mansoni* are found, and since 1931 the urinary infection rate has been 2·4–4·9 per cent. for Europeans, 18·5–26·7 per cent. for Africans ; the rates for intestinal infections were 2·1–3·8 and 10–15·6 per cent. for Europeans and Africans respectively. The African figures relate to hospital patients, and to that extent are selected. Blair admits that it is not known if the incidence of schistosomiasis is actually increasing, or whether increased awareness is leading to increasing investigation, but his own impression is that there is an increase of schistosomiasis in all sections of the community, and that it is serious. Although it is difficult to assess the importance of the disease as an ultimate cause of mortality, there is little doubt that it causes much illness, and it is regarded as one of the two major problems of public health, the other being malaria. Study of schistosomiasis has been pushed on, in spite of the war.

Attack may be made on the worm, or the snail, at various stages. In the human host treatment can be given which is reasonably effective ; the intensive course instituted by Alves and the author is now well known. In field work diagnosis presents difficulty, and the author shows that many cases may be missed if reliance is placed on a single microscopic examination of urine or faeces. There has recently been an increasing tendency to perform diagnostic cystoscopy, or to take biopsy specimens from the rectum, but even these methods will not reveal all cases, and for diagnosis on a large scale they are not

practicable. Blair describes the antigen for skin testing, prepared from cercariae, and used on a large scale by Alves and himself [see this *Bulletin*, 1947, v. 44, 826]. The specificity of the test seems to be good, and the results have shown that 50–80 per cent. of the African population are positive ; in one half of these, eggs are found in the excreta. The preparation used for intensive one-day treatment is sodium antimony tartrate, and the author has no doubt that it is better to use this than the potassium salt.

Prevention of contamination of streams is, of course, difficult, and little progress has been made, but the attack on the snails is now perfectly feasible ; the author uses an empirical dose of 15–20 parts of copper sulphate per million, sprayed in strong solution, or broadcast as a powder, or dissolved from a sack dragged through the water. Much remains to be learned about the best conditions for treating water, and about the snails themselves. The rival claims of fish culture and snail destruction may need to be balanced, but in Egypt copper sulphate is used up to 50 p.p.m. without detriment to fish. Naturalistic methods of controlling snails have been suggested, but cannot be relied upon.

Irrigation works and water-storage dams should be planned from the beginning with schistosomiasis in mind ; the tendency to disregard it until a large snail population is established, and human cases have occurred, is obviously bad, and a proper scheme of water management should be instituted at the outset.

Blair makes the point that *Planorbis pfeifferi* has a restricted and selective distribution, yet *S. mansoni* cases are much more generally distributed ; *Bulinus tropicus*, the intermediate host of *S. haematobium* in Egypt, has never been found infected in Southern Rhodesia. [Baylis (this *Bulletin*, 1932, v. 29, 408) gives *B. tropicus* as a host of *S. mansoni*, and *B. truncatus* (synonyms *contortus*, *dybowskii*, *innesi*) as a host of *S. haematobium*.] Such matters need, and are receiving, attention.

Cercariae are killed by modern methods of water purification, but can penetrate filters and withstand a dose of chlorine which kills bacteria ; moreover, they can live 100 hours in winter, so that storage of water for 48 hours is not the safety measure it was once thought to be. Protection of water is partly a matter of construction of wells and abandonment of the use of streams and dams for domestic supplies or for bathing. But, of course, this is extremely difficult.

[This is a succinct and readable account of the measures taken to control schistosomiasis in Southern Rhodesia. For other papers by Alves and Blair, see this *Bulletin*, 1946, v. 43, 344, 752 ; 1947, v. 44, 826, 827, 829.]

Charles Wilcocks

Abbott, R. T. **Handbook of Medically Important Mollusks of the Orient and the Western Pacific.** *Bull. Museum Comparative Zoology, Harvard College.* 1948, Apr., v. 100, No. 3, 245–328, 14 text figs. & 5 pls. [20 refs.]

Relatively few molluscs act as intermediate hosts for trematodes parasitizing man, and all those of medical importance belong to the fresh-water Gastropoda. Nevertheless, every parasitologist interested in trematode infections, but lacking the specialized training of a malacologist, has experienced difficulty when working in the tropics in identifying the comparatively few medically important species occurring in this group, and has usually had to rely on sending home his specimens for identification by the expert.

Lt. Tucker Abbott's handbook is written with the praiseworthy object of allowing the field worker in the Orient to identify his snails on the spot ; indeed, the book loses much of its value when removed from the field, for the system of

identification recommended is based on the study of the external characteristics of the living snail as well as on the differentiation of shell characters and, when necessary, a study of the teeth in the radula.

In so brief a handbook—there are only about 100 pages—and one intended for the use of the medical parasitologist, emphasis is, of course, placed on those species which have been implicated as carriers of human disease, but harmless species likely to be confused with their dangerous relatives are carefully described.

Having dealt with the gross anatomy, the shell, and the radula in sufficient detail to enable the tyro to recognize the anatomical landmarks necessary for the identification of species, the author then lists the molluscan carriers of the trematode diseases of man.

The next, and most extensive section of the book, consisting of 52 pages, is devoted to a systematic account of the medically important Gastropoda, although, as already noted, it includes brief accounts of species likely to be confused with known vectors. In connexion with the recognition of the molluscan carriers of *S. japonicum*, the author writes " In examining dozens of genera and hundreds of species of Pacific and Asiatic fresh-water mollusks over a period of eight months in the field, it was found that all snails capable of carrying *Schistosoma japonicum* cercariae possess the following animal characters and that no other species of mollusks possess these characters : ' Animal with two slender gray tentacles with a color-streak or " eyebrow " of bright yellow, closely-packed granules embedded in the skin just above the tiny black eyes.' " It would be interesting to know whether a similar grouping of molluscs susceptible to infection with *S. haematobium* and *S. mansoni* can be shown to exist in other parts of the world. Although this section of the book is entitled a systematic account, it contains much valuable information concerning the ecology, habits, and distribution of the more important species.

The hosts of *S. japonicum* are given as follows :—

Oncomelania quadrasi Moellendorff
Oncomelania formosana Pilsbry and Hirase
Oncomelania nosophora Robson
Oncomelania nosophora slateri Bartsch
Oncomelania hupensis Gredler

The last seventeen pages of the book are devoted to : (*a*) a brief account of the poison cone shells ; (*b*) the technique of collecting and handling infected snails ; (*c*) methods of rearing *Oncomelania* in the laboratory ; (*d*) the control of the intermediate snail host, and, finally, two appendices, the first of which deals with a generic discussion of *Schistosomophora*, *Katayama* and *Oncomelania*, and the second with the revision of the molluscan names appearing in textbooks on parasitology.

This book will form an essential part of the equipment of all workers who are interested in trematode infections of man in the Orient and Western Pacific, and it is to be hoped that its publication will encourage the production of a similar handbook intended for the use of workers in Africa. *R. M. Gordon*

ABBOTT, R. T. **A Potential Snail Host of Oriental Schistosomiasis in North America** (*Pomatiopsis lapidaria*). *Proc. U.S. Nat. Museum.* Wash. 1948, v. 98, No. 3222, 57–68, 14 figs. (12 on 2 pls.). [14 refs.]

STUNKARD [this *Bulletin*, 1947, v. 44, 432] tested certain North American snails for capacity to act as intermediate hosts of the schistosomes of man, and obtained some evidence that *Pomatiopsis lapidaria* is capable of acting as intermediate host of *Schistosoma japonicum* up to the sporocyst stage. [In the

abstract of Stunkard's paper, referred to above, it is wrongly stated that the experiment was conducted with *S. mansoni*.]

The author describes this snail in detail, and shows on a map the 170 places in the United States from which it has been reported. There are few differences in morphology between the genera *Pomatiopsis* and *Oncomelania*, and the fact that *P. lapidaria* is a host of *Paragonimus kellicotti* in North America, and *O. nosophora* a host of *P. westermanii* in China [CHEN, *Nat. Med. J. China*, 1941, v. 27, 550] may indicate that the two snails have a similar physiological constitution. *Charles Wilcocks*

BRACKEN, M. M., BAILEY, W. R., Jr. & THOMAS, H. M., Jr. **The Lesions of Schistosomiasis Japonica.** *Amer. J. Path.* 1948, May, v. 24, No. 3, 611–23, 6 figs. on 3 pls. [16 refs.]

The clinical picture of acute *Schistosoma japonicum* infection among American troops in the Philippines has been widely described ; a description of the lesions in man during the acute stage is largely lacking. Death is unusual in the acute stage of the disease, but material was available from autopsies performed overseas on three American soldiers suffering from early eastern schistosomiasis. Biopsy specimens from acute lesions in the rectum, liver, and skin of other patients were also available ; and there was material from cerebral lesions in Army personnel returning to the U.S.A. Specimens from older lesions were obtained from three Filipinos who died of gun-shot wounds.

The histological changes of schistosomiasis in man resemble those seen in experimental infections of small animals. The lesions run a fairly uniform course, varying slightly from organ to organ. The presence of an ovum at first causes an extensive cellular reaction, eosinophils predominating. Necrosis may occur in a wide zone around the ovum. Epithelioid cells appear, and multinucleate giant cells envelop the ovum ; these are followed by lymphocytes and plasma cells. Fibroblastic and capillary proliferation develop in the periphery of the lesion, which ultimately fibroses ; the ovum becomes shrunken and calcifies in a dense fibrous tissue mass with moderate lymphocytic infiltration. *A. R. D. Adams*

ESKOLA, O. **On the Amount of Urobilin excreted in Urine and Faeces in Pernicious Tape-Worm Anaemia and its relation to the Reticulocyte Crisis.** *Ann. Med. Intern. Fenniae.* 1948, v. 37, No. 1, 1–15, 25 figs. [32 refs.]

The author states that the excretion of urobilin by patients suffering from pernicious tapeworm anaemia (due to *Diphyllobothrium latum*) has not been systematically investigated. He therefore studied it in 19 patients suffering from this form of anaemia, with 6 healthy subjects as controls. A complete blood picture was first obtained. The tapeworms were then expelled with filicin and Epsom salts. Three days were then allowed to eliminate the effects of the filicin on the liver. The amounts of urobilin excreted in the faeces and urine during each 24 hours were then determined by the spectrophotometric method of HEILMEYER, and KREBS, (*Biochem. Ztschr.*, 1931, v. 231, 393) and also by the reduction method of TERWEN (*Deut. Arch. klin. Med.*, 1925, v. 149, 72). [In text given as Terwin.] Each morning during the tests the reticulocytes were counted. The diet of the patients was kept as uniform as possible. Errors due to the following causes were as far as possible eliminated : disorders of the liver, organic heart diseases, infections likely to cause hepatitis, haemolytic conditions likely to cause increased excretion of urobilin, extravasation of blood, diarrhoea, acid fermentation in the bowel and abundance of chlorophyll in the faeces.

The results obtained with the 6 healthy and 19 anaemic subjects are described and illustrated with graphs. The author concludes that the urobilin excreted by the 6 healthy subjects during 24 hours was 75 to 180 mgm. in the faeces and 0·4 to 2 mgm. in the urine.

The urobilin excreted by the anaemic patients generally increased before liver treatment; it varied between 200 and 540 mgm. in the faeces and between 2·5 and 10 mgm. in the urine during the 24 hours. After adequate liver treatment the urobilin excretion rose in all the anaemic patients, rising in one patient to 1,040 mgm. in the faeces and 36 mgm. in the urine in 24 hours, after which it fell to normal.

This increase of urobilin after liver treatment seemed in these cases to last 10 to 19 days, with an average of 14·8 days, starting one or two days after the rise of the reticulocyte count and ceasing in 2 to 5 days, with an average of 3 days, after the reticulocyte response. The author thinks that this suggests that the haemolysis is a secondary factor in the genesis of pernicious tapeworm anaemia, because the signs of haemolysis vanished with the improvement in the bone marrow which followed the liver treatment. The maximum of urobilin excretion was reached slightly after the reticulocyte peak and from then onwards slowly decreased. For reasons given in the paper, the author concludes that the time required for the urobilin to rise and become normal again represents the life-span of the megalocytes, and he concludes that this life-span is 7–14 days.

G. Lapage

Basnuevo, J. G. Teniasis y estaño (II). [**Tin in the Treatment of** *Taenia saginata* **Infestation.**] *Rev. Kuba Med. Trop. y Parasit.* 1948, June, v. 4, No. 6, 119–21. English summary.

A patient who had received 16 treatments with different drugs unsuccessfully on account of infestation with *T. saginata* during 24 years, was given by the author tablets containing the metal and salts of tin, each containing powdered tin 0·25 gm., tin protoxide 0·04 gm. and the chloride 0·001 gm. He was given 10 tablets (which he calls Solitaricide Kuba) on each of two successive days and he passed a tapeworm 7 metres in length. The scolex was not found, but 14 months later, neither ova nor proglottides had been seen in the faeces. Ten patients were treated in this way and 6 were cured. Later, the following was the scheme of treatment: A saline purgative the evening before; next morning, 5 tablets before any food was taken, and 5 more every half hour till 20 tablets had been taken in all. Six hours later light food was given and at bedtime that evening a purgative. During the ensuing 4 days 5 tablets are taken daily, making 40 altogether. For children, the dose is 1 tablet for each year of age up to 10; over 10 years the same dosage as for adults, and for the 4 following days 1 tablet for every two years of age.

Seven patients were treated by the 40 tablet method; 3 were certainly cured, 3 were apparently cured, for three months later examination revealed no signs of infestation. In none was the scolex found and it is thought that, though the worm is killed, the scolex has clung to the mucosa and does not pass out with the faeces. [See also this *Bulletin*, 1948, v. 45, 921.]

H. Harold Scott

Swierstra, D. Enige mededelingen over echinococcosis. [**Observations on Echinococcus Infection.**] *Tijdschr. v. Diergeneesk.* 1948, Aug. 1 & 15, v. 73, Nos. 15/16, 640–45.

The English summary appended to the paper is as follows:—

" The author gives a short description of some problems and diagnostic methods about echinococcosis for veterinarians. Literature gives little information about the duration of life of *Echinococcus granulosus* in the intestines of dogs.

" The opinion of Tenhaeff en Ferwerda was that the duration of life was three months.

" Some diagnostic, especially differential diagnostic methods in relation to C. tenuicollis are mentioned."

SNELL, D. G. & MUKASA, S. B. K. **A Case of Hydatid Disease of the Liver.** *East African Med. J.* 1948, July, v. 25, No. 7, 288–9.

The first case to be reported from Uganda.

MILLER, D. & FLEMING, J. **Intracranial Hydatid Disease, with Report of a Case.** *Australian & New Zealand J. of Surgery.* 1948, Apr., v. 17, No. 4, 291–6, 5 figs.

OSIMANI, J. J. Parasitismo humano por *Dipylidium caninum* (Linneo, 1758). [**Human Infestation by** *Dipylidium caninum.*] *Rev. Kuba Med. Trop. y Parasit.* 1948, July, v. 4, No. 7, 143–5.

The English summary appended to the paper is as follows :—

" History is reported of an infant, 8 months old, parasitised by *Dipylidium caninum* (Linneo, 1758), apparently without symptoms. The worm is evacuated by means of oral administration of both garlic and santonine. Considering the form of observation, the share of each remedy in the success of the treatment cannot be determined."

BRUMPT, L. C. & GUJAR, B. J. **The Treatment of Polycythemia by Artificial Infection with** *Ancylostoma duodenale.* *Indian Med. Gaz.* 1948, Apr., v. 83, No. 4, 166–9.

PASSOS, W. & BARBOSA, N. de C. " *Syngamus laryngeus* " na espécie humana. [**Human Infestation with** *Syngamus laryngeus.*] *Rev. Brasileira Med.* Rio de Janeiro. 1948, May, v. 5, No. 5, 340, 1 fig.

A woman, 45 years of age, complained of a dry, obstinate cough of three months' duration. On examination of her throat a small red spot was seen which was thought to be a foreign body, a fragment of coloured cotton, and the patient was asked if she was in the habit of biting off her cotton when sewing. To the examiner's surprise the spot was seen to move and a worm was extracted which proved to be *Syngamus laryngeus*, a genus occurring in sheep, cattle, goats and birds, but exceedingly rarely in man. The symptoms cleared up at once and have not recurred. No suggestion is offered as to the mode of acquirement of the parasite in this case. *H. Harold Scott*

KLASENS, H. W. Een geval van *Ascaris lumbricoides* in de tuba. [**A Case of** *A. lumbricoides* **in the Fallopian Tube.**] *Nederl. Tijdschr. v. Geneesk.* 1948, Sept. 4, v. 92 (iii), No. 36, 2756–8.

The English summary appended to the paper is as follows :—

" Description of a case of ascaris lumbricoides in the right Fallopian tube ; in all probability the worm had left the intestine via the appendix.

" The remarkable thing about this case was the cyclic course of the symptoms, which stretched over a period of four months, and the close connection of the symptoms with the menses."

NAJI, K. **Intestinal Obstruction due to Ascariasis. Report of a Case.** *Lancet.* 1948, Sept. 25, 495.

LAPEYSSONNIE, L. Un cas d'asthme d'origine ascaridienne. [**A Case of Asthma caused by** *Ascaris.*] *Bull. Méd. de l'Afrique Occidentale Française.* 1947, v. 4, No. 3, 211–14.

PINTO, A. R. & DE ALMEIDA, C. L. Contribuição para o estudo das filariases da Guiné Portuguesa. [**A Study of Filariasis in Portuguese Guinea.**] *An. Inst. Med. Trop.* Lisbon. 1947, Dec., v. 4, 59–89, 25 figs. (1 folding map). [14 refs.] English summary.

In this study the authors had in view : (1) Investigation of the details of the periodicity and of the proportion of persons infested among those with elephantiasis and those infested who presented no objective signs ; (2) Identification of the transmitters ; (3) Study of the clinical aspect and the incidence by age and sex ; (4) Finding out what filariae other than *Wuchereria* were present and to what extent, in the district. A line map indicates the district investigated and photographs illustrate the terrain and the dwellings and patients showing enlarged glands, especially in the groin, and various stages of elephantiasis of the legs and scrotum.

A list of the chief diseases met with during examination of 6,227 Africans gives 134 with conjunctivitis, 130 with urinary schistosomiasis, 68 with enlarged glands, 64 with scabies, 40 with umbilical hernia, 34 with leprosy, only 28 with hookworm, and 21 with sleeping sickness. Blood samples were taken at night from 986 of different ages and either sex, whether they did or did not show signs of filarial infection ; 485 (49·2 per cent.) had filarial embryos in their blood. Of 172 positive who were examined again 130 had microfilariae in both day and night specimens, 42 in night specimens only. Five patients had their blood taken every two hours and the peak was seen to be between 10 p.m. and 2 a.m. Subjects with no objective signs harboured microfilariae in their blood more than those with signs, in a proportion of 7 to 5 (68 and 47 per cent.) ; only 20·6 per cent. of those with elephantiasis were blood-positive. *Anopheles gambiae* seemed to be the chief vector ; it was by far the commonest mosquito, 95 per cent. of nearly 2,000 captured ; *Culex fatigans* only 2·5, *Aëdes aegypti* 0·1 and *Taeniorhynchus* sp. 1·4 per cent. ; only one of *C. fatigans* was found infected, but 5 of the 28 *Taeniorhynchus.*

At all ages from infants to old people, enlargement of the epitrochlear glands was the commonest sign (between 58 and 70 per cent.) and, next, inguinal adenitis in 29 to 40 per cent. Elephantiasis was not very common ; in some districts only 1 per cent. of the infested, and in none over 10·2 per cent.

As regards other filariae, 1,154 specimens of blood were examined for *Acanthocheilonema perstans* and the embryos were found in 36 (3·1 per cent.) ; 28 were among 460 preparations from males (6 per cent.), but only 8 among 658 females (1·2 per cent.). *H. Harold Scott*

GALLIARD, H., HUARD, P. & NGU, D. V. Recherches sur la filariose à *Wuchereria bancrofti.* Effets de l'intervention chirurgicale et de l'extirpation des filaires sur le rythme de la périodicité et sur la persistance des microfilaires. [**Effects of the Extirpation of** *Wuchereria bancrofti* **on the Rhythm of Periodicity and Persistance of Microfilariae.**] *Ann. Parasit. Humaine et Comparée.* 1947, v. 22, Nos. 5/6, 332–44, 6 figs.

The phenomenon of periodicity appears complex judging by the number of hypotheses which have been formulated—mechanical, physiological and biological—as affecting the host-parasite association.

The presence of great numbers of patients with filariae in Hanoi served to stimulate research on the effects of surgical operation upon periodicity, but special attention was directed to the influence of extirpation of female filariae upon the numbers of circulating microfilariae. The serious nature of the operation procedures precluded the carrying out of periodic daily blood examinations, but nevertheless curves were worked out from counts of microfilariae 2–4 days before and 3 days after operation and thenceforward at stated intervals. In every case a count was made at 11 a.m. and again at 11 p.m. The eight patients were all males and were suffering mostly from filarial disease of the genital organs.

In the first case, a general anaesthetic was administered, but no operative procedures were undertaken, but neither the rhythm nor the periodicity of the microfilariae (*bancrofti*) was disturbed.

In the second, radical cure for hernia brought about a diminution of the curve and retardation for twenty-four hours, but with complete restoration to its former level on the fourth day. The third was rather a similar case and a modification of the curve ensued, with delay of the maximum peak, but without any reduction in the total number of microfilariae.

In the fifth case (bilateral orchi-epididymitis with fistula) five living female filariae were recovered, after which *inversion* of periodicity was noted, with gradual return to normal nocturnal rhythm 18 days after operation.

In the sixth (hydrocele of six years' duration) ten female filariae were found in lymphatic varices and in the eighth with a similar affection six were recovered. In case seven no adult filariae were found, but after epididymectomy the count was reduced for 4 days.

These three latter were especially important because a primary alteration of rhythm was most marked: in case 6 the maximum peak was postponed for four hours: in number 8 a diminution of microfilariae was noted within two hours on the evening of the operation, but with a return to normal on the 16th day. In one case only (5) there was complete disappearance of microfilariae for 12 days, but with ultimate restoration of the level recorded before operation.

Thus it will be seen that operative interference, whether entailing destruction of a number of parturient females or not, exerts no effect upon the number of microfilariae nor upon their periodicity.

Estimations upon the blood eosinophilia failed to show any effect upon the percentage of these cells.

General anaesthesia by itself appears to be incapable of producing even a temporary depressing effect upon the microfilarial curve. Destruction of a considerable proportion of the total number of adult female filariae, even if the patient is in a state of " hyperfilariation " has only a negligible effect upon the total circulating microfilariae, and this certainly presents an astounding puzzle. Finally, it seems that surgical shock and physiological disturbance are capable of exerting the most immediate and prolonged dislocation of microfilarial rhythm. *P. Manson-Bahr*

MAZZOTTI, L. Resultados negativos de la administración del " Hetrazan " en dos pacientes infectados con *Mansonella ozzardi*. [**Negative Results with the Administration of Hetrozan to Patients Infected with** *Mansonella ozzardi*.] *Medicina*, Mexico, 1948, July 25, v. 28, No. 560, 317–18.

HERMANS, A. G. J. Onderhuidse gezwellen, veroorzaakt door *Filaria volvulus* (*Oncocerca volvulus*). [**Subcutaneous Nodules due to** *O. volvulus*.] *Nederl. Tijdschr. v. Geneesk.* 1948, Aug. 28, v. 92 (iii), No. 35, 2631–8, 4 figs. (2 on pl.). [Refs. in footnotes.]

The English summary appended to the paper is as follows :—

" In subcutaneous ulcers of a 45 year old woman patient specimens of Filaria volvulus (Oncocerca volvulus) were found. The patient appears to have been infected in tropical West-Africa.

" Symptomatology, diagnosis, occurrence and treatment of oncocerciasis as well as the observations known from literature are discussed."

DEJOU L. Kystes suppurés et abcès chroniques par vers de Guinée. [**Suppurating Cysts and Chronic Abscesses caused by Guinea Worms.**] *Bull. Soc. Path. Exot.* 1948, v. 41, Nos. 3/4, 200–202.

Cysts caused by guinea worms can develop slowly and like cold abscesses. They may be all the more difficult to diagnose because they may develop in patients who have never expelled a guinea worm or have done so only several months or years previously. The author records three cases which illustrate this statement, one of his own and one presented by each of two other medical men.

The first patient, aged 20, was admitted with a diagnosis of a teno-synovial cyst on the posterior aspect of the lower third of the right forearm. It was a large, fluctuating, cold, painless swelling, adherent at its base, which had developed during the past year after fever and headache, but had never been painful. Puncture of the swelling yielded thick, sterile pus containing polymorphonuclear cells and lymphocytes. Dissection revealed a sac adherent to the superficial aponeurosis of the limb. The sac had two walls, the histological features of which are briefly described. In the pus a fragment 10 cm. long of a degenerate and partly calcified guinea worm was found. No microfilarial larvae were discovered.

The second patient, aged 40, had a similar swelling of the anterior aspect of the right forearm, but this was covered with oedematous and infiltrated skin. The swelling had developed in two months and it obstructed the movements of the fingers, which were in a state of irreducible flexion. This swelling went deeper and from it came abundant pus in which were found a fragment of a flattened guinea worm and immobile microfilariae. The patient had expelled numerous guinea worms several months earlier.

The third patient, aged 25 years, had a swelling at the level of the left spermatic cord and had suffered from total impotence for six months. The cyst was removed and three weeks later the patient experienced erections. The histological structure of the wall of the cyst is described. In the cyst was an almost intact, but apparently dried up, guinea worm. *G. Lapage*

DEFICIENCY DISEASES

i. BLANC, F. & SIGUIER, F. A propos de 8 cas de pellagre observés au cours de dysenteries amibiennes chroniques. [**Eight Cases of Pellagra in Patients with Chronic Amoebic Dysentery.**] *Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1947, Nos. 23, 24 & 25, 630–36.

ii. —— & ——. Les pellagres post-dysentériques. [**Post-Dysenteric Pellagra.**] *Ibid.* 636–42. [Refs. in footnotes.]

i. In two patients with chronic amoebic dysentery there was a sudden onset of painful erythema of exposed parts, with aphthous stomatitis and mental symptoms—irritability and depression. Rapid relief was produced by a single injection of nicotinamide (250–500 mgm). The response to treatment, together

with the clinical findings, suggested a diagnosis of pellagra. Brief mention is made of six other cases of amoebiasis, in which erythema of the limbs or aphthous stomatitis were cured by nicotinamide.

ii. Since in none of the cases was there a history of a deficient diet, the pellagra was attributed to malabsorption. All the patients suffered from chronic and severe diarrhoea, with 15 to 30 stools a day. This did not respond to nicotinamide, but was relieved by anti-amoebic treatment. In spite of the diarrhoea the patients were generally well nourished, and showed no signs of deficiency states other than pellagra. It is suggested that, in order to avoid this complication, patients with amoebic dysentery should be given a good mixed diet, and not a severely restricted one. *J. C. Waterlow*

GOUNELLE, H. Pellagre et carences d'apport. [**Pellagra and Contributory Deficiencies.**] *Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1947, Nos. 30/31, 911–14. [12 refs.]

The authors refer to the papers by Blanc and Siguier (above), and suggest that deficiency of nicotinamide may not be the sole cause of pellagra. During the war they studied an epidemic of pellagra occurring among the inmates of an institution, and compared the diet of the patients with that of the average citizen of Paris. The institutional diet contained slightly *more* nicotinamide than that of the Parisians, but less fat and animal protein [see also MONTEIRO *et al.*, this *Bulletin*, 1947, v. 44, 340; AYKROYD and SWAMINATHAN, *ibid*, 1940, v. 37, 797].

Such observations suggest that deficiency of amino-acids as well as of nicotinamide may play a part in the genesis of pellagra. This view is supported by the demonstration, both in experimental animals and in man, of a metabolic relationship between nicotinic acid derivatives and tryptophan. (PERLZWEIG *et al.*, *J. Biol. Chem.* 1947, v. 167, 511,; LUECKE *et al.*, *J. Nutrition*, 1947, v. 33, 251; KREHL *et al.*, *J. Biol. Chem.*, 1946, v. 162, 403). *J. C. Waterlow*

HAEMATOLOGY

GIRDWOOD, R. H. **Anaemia and Marasmus in Indian Troops on Active Service.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1948, July, v. 42, No. 1, 65–82. [22 refs.]

An investigation into the cause of anaemia and marasmus among Indian troops was started in the early part of 1945. The haemoglobin percentages of the bloods of 500 Indian soldiers passing through a transit hospital in Bengal were ascertained. The mean of the group was 14·17 gm. per 100 ml.: 2·4 per cent. were below 8 grammes and 11 per cent. below 11 grammes. There was no significant difference between the meat-eaters and the non-meat-eaters, nor between groups arranged according to length of service, with the exception that those with less than a year's service had only 11·89 gm. per 100 ml. which was significantly lower than the rest. However, this group was almost entirely composed of men from a Pioneer unit which had a strikingly low mean haemoglobin percentage.

During July, 1945, 93 cases from east of the Brahmaputra river were admitted to a special anaemia centre. Stool examinations for ova were carried out by a concentration method in 61 cases, and in 25 (41 per cent.) ancylostome ova were found [weight of infection not stated]. The mean haemoglobin concentration of the 25 patients with hookworm infection was significantly lower than that of those with no ova in their stools.

One hundred and twenty-four Indian other ranks suffering from the marasmus syndrome were investigated. The haemoglobin findings in 27 are reported. All but one came from east of the Brahmaputra river and the average duration of symptoms was 17 weeks. Data regarding food supply was unsatisfactory: 84 of the group were meat-eaters, but supplies of fresh meat were negligible in the jungle areas. Most of them had had malaria; a record of the finding of parasites was obtained in 51 cases, and all but 6 had received mepacrine regularly. "There was nothing in the history of these men to suggest that either bacillary or amoebic dysentery played a part in the onset of their illness." Stool examinations in 88 cases revealed ancylostome ova in 27, *E. histolytica* (vegetative form) in 4 and cysts in 1; other protozoa and helminths were found, but 44 cases were negative.

The commonest clinical features were diarrhoea (83), flatulence (75), anorexia (70), abdominal pain or discomfort (69), vomiting (60), fever (44), glossitis, marked evidence of loss of weight (52), palpable spleen (33), and marked dryness of skin (33).

"According to the findings of the absolute indices, the distribution of the types of anaemia in the cases under consideration was as follows: orthochromic macrocytic, 17: hypochromic macrocytic, 8: hypochromic orthocytic, 2."

Megaloblasts indistinguishable from those found in pernicious anaemia, except that haemoglobinization of the intermediate megaloblasts was less advanced, were found in the sternal marrow in 62 out of 96 cases.

Many patients had shown resistance to treatment with crude liver extract by intramuscular injection in their previous hospital treatment: in some of these cases megaloblasts still persisted. Liver injections, with the addition of mepacrine therapy, were given in 8 cases, significant improvement only occurred in 2. The liver injections, however, appeared to precipitate an attack of malaria in each of five of these cases. Neither folic acid nor protolysed liver was available at the time of the investigation.

The author gives no "conclusions", nor in the "summary" is there any expression of opinion on the aetiology of the condition. The following quotation might possibly be taken as his tentative opinion on the aetiology of the anaemia, but it appears to have little connexion with the data he has presented:—

"It is evident that the anaemia described in the present series of cases is of a very complex type. Possibly years of primary malnutrition prior to joining the Services played a part in many cases, and was aggravated more recently by supply difficulties during jungle fighting. Thus there might be a deficiency of Wills's factor, and conceivably of extrinsic factor, which would give a tendency to megaloblastosis. In addition, there was a sprue-like condition, which itself might induce a megaloblastic form of anaemia due to malabsorption of the liver factor produced by the interaction of Castle's extrinsic and intrinsic factors, or of folic acid conjugate (Davidson, and Girdwood, 1947). To what extent prolonged low intake of protein of high biological value plays a part is unknown.

"Malarial infection, when present in men suffering from such a deficiency syndrome, might add a haemolytic element, and thus increase the megaloblastosis in the manner described above." *L. E. Napier*

AIENGAR, N. A., NAIDU, B. R. L., KRISHNAMURTHY, C. B. & RANGANNA, B. **Observations on Anaemia in the Malnad Parts of the Mysore State.** *Indian Med. Gaz.* 1947, Aug., v. 82, No. 8, 488–93, 10 figs. on 1 pl.

Anaemia associated with nutritional deficiencies, malaria and hookworm disease is severe and widespread in the Shimoga and neighbouring districts of

Mysore, where the average diet appears to be extremely poor in protein and fat. Some 2,000 patients were studied in hospital during four years, and approximately one third of the patients had total erythrocyte counts of less than 1½ million per cmm. Treatment consisted initially of liver extracts, iron and quinine; vermifuges were given later, when the patients' condition had improved. The results of such treatment appeared disappointing, and the real remedy would seem to lie in fundamental measures to raise the standard of living and of education in the affected regions. *F. Murgatroyd*

BAUER, J. **Sickle Cell Disease. Circulatory Stasis in Small Blood Vessels.** *Acta Med. Scandinavica.* 1947, Oct. 15, v. 129, No. 1, 1–11.

This paper contains nothing new, but emphasizes that the important pathological process in sickle cell anaemia is the circulatory stagnation caused by deformation of the erythrocytes, which produces haemolysis, thromboses, and ischaemia of the tissues with later endarteritis and fibrosis in the affected area. *F. Murgatroyd*

VENOMS AND ANTIVENENES

DEL POZO, E. C. **The Action of the Venom of a Mexican Scorpion (*Centruroides noxius*, Hoffmann) on Cholinesterases.** *Brit. J. Pharmacol. & Chemotherapy.* 1948, Sept., v. 3, No. 3, 219–22, 1 fig.

"The effects of extracts of the venom of a Mexican scorpion (*Centruroides noxius*, Hoffmann) were examined on cholinesterase preparations with the view of finding out if the 'eserine-like' effects this venom exerts on isolated tissues and in animals on intravenous injections could be explained by a cholinesterase inhibiting property. The venom extract was only found to inhibit pseudo- as well as true-cholinesterase when present in very high concentrations. It is concluded that the symptomatology of the venom poisoning is independent of, or dependent to a very slight degree only on, inhibition of cholinesterase."

DE MAGALHÃES, O. Combate ao escorpionismo. Nota prévia. [**Dealing with Scorpions.**] *Brasil-Medico.* 1948, Apr. 17 & 24, v. 62, Nos. 16/17, 169–70.

The author describes the results of Gammexane on scorpions in Brazil, notably the *Tityus bahiensis*. The substances used were the fluid LG–140 which contains 10 per cent. of the gamma isomer by weight and is diluted 1 in 30 with kerosene, or the powder D–034 (which contains 0·5 per cent. of the isomer) 1 gm. emulsified in 30 gm. of kerosene. After contact for 1–5 minutes the scorpions die in 20 minutes or so. The symptoms seem to be in three phases: In the first, though poisoned they show nothing definite; then they become very excited and agitated, running from one side of the containing box to the other, tails erect and striking at everything within reach around them; this is followed by the third phase of ataxia and paralysis, in which they run about in a disorderly manner, are ataxic with generalized tremors, or move in small circles before becoming paralysed. Gammexane should prove very serviceable in dealing with dangerous scorpions in Brazil. *H. Harold Scott*

ARIZONA MED. 1948, July, v. 5, No. 4, 54–61. **Modern Treatment of the Bites and Stings of Small Desert Animals.**

[This is a sort of Brains Trust on medical problems, or a team reply to the Any Questions section of the *British Medical Journal*. An actual case is

recorded and a team of six, whose qualifications to reply are detailed, is named, each member of which expresses his opinion on the diagnosis and treatment.]

A child of 8 years was bitten on the ankle by something unknown. He was taken to hospital and 30 minutes after infliction of the injury there was an area of redness 2 inches above the right ankle and a single indistinct puncture wound, but no discoloration. The child was conscious, nervous and restless [in fact, there seems to have been little wrong and much of the child's symptoms might have been due to parental panic]. The members of the panel gave their opinions in turn, taking into consideration scorpion sting, spider bite, especially *Latrodectus mactans*, a small rattlesnake, a centipede [with a single puncture ?], tarantula, Gila monster, coral snake, bee, wasp, or red ant sting. The treatment of each of these—first aid by a tourniquet, local application of cold, incision (if no doctor is near), stimulants for shock, and specific treatment by antivenenes and anti-histamine drugs—is stated by different members of the team, but in rather general terms. [The principle of the series is that any doctor confronted by a difficulty can send it up for discussion by specially chosen consultants. If urgent, a reply is sent direct, without waiting for publication.] *H. Harold Scott*

DERMATOLOGY AND FUNGUS DISEASES

MOTTA, L. da C. **Paracoccidioidal Granulomatosis. Cardiac Localization in a Case of Generalized Form.** *Amer. J. Path.* 1948, Mar., v. 24, No. 2, 323–37, 12 figs. on 3 pls. [20 refs.]

The author gives a fully documented account of the history and nomenclature of the fungus *Paracoccidioides brasiliensis* (Splendore) Almeida 1930, followed by a discussion of the clinical features of the South American and North American types of blastomycosis, which are clearly differentiated from each other. He points out that the cutaneous lesions in the South American disease are invariably secondary, and are due to dissemination of the fungus from some deeper focus. He agrees with other observers that the primary lesions occur on the bucco-pharyngeal mucosa in the form of granulomatous ulcerations frequently of a papillomatous or vegetative character, which indicate an oral path of infection. From these lesions the infection reaches the cervical lymph nodes and extends to the supraclavicular, axillary and other groups, constituting the "lymphatico-tegumental" form of the disease. From 3 to 18 months later, a general dissemination of the parasite through the blood stream may occur, causing cutaneous and visceral lesions, which may affect nearly all tissues of the body, and death soon follows.

A detailed account is given of the post mortem examination of a case of the generalized disease in which the fungus was found in destructive lesions of the cardiac musculature, and in its actively reproductive form in the lumen of a cardiac blood vessel, indicating a "septicaemic" state. Both of these are original observations. *J. T. Duncan*

LACAZ, C. DA S., ASHCAR, H., COSTA, O. & VIOTTI, M. R. Ação da estreptomicina "in vitro" sôbre o paracoccidioides brasiliensis. Ensaio terapêutico na blastomicose sul-americana. [**Action of Streptomycin *in vitro* on *Paracoccidioides brasiliensis* and Attempts to use it in the Treatment of South American Blastomycosis.**] *Hospital.* Rio de Janeiro. 1948, May, v. 33, No. 5, 693–703, 2 figs. [10 refs.]

"The authors study the action 'in vitro' and 'in vivo' of streptomycin upon *Paracoccidioides brasiliensis*, agent of South-American blastomycosis.

High concentrations (5,000 U. to ml, and onwards) of streptomycin inhibit growth of *P. brasiliensis* at its 'lag phase' or phase of logarithmic growth. Lesser concentrations have no effect upon *P. brasiliensis*. The authors verified that this fungus may have an inhibitory action upon streptomycin. After the studies 'in vitro', the authors made use of streptomycin in a case of generalized ganglionar blastomycosis; 29 grs. were employed on the whole (1·5 grs. daily). The lesions did not recede with this treatment, but general conditions of patient remained stationary. The observation is drawn to a close by showing streptomycin's low therapeutic value in cases of blastomycosis. Sulphonamidic preparations are still the therapeutics to be relied upon."

LITTMAN, M. L., WICKER, E. H. & WARREN, A. S. **Systemic North American Blastomycosis. Report of a Case with Cultural Studies of the Etiologic Agent and Observations on the Effect of Streptomycin and Penicillin in Vitro.** *Amer. J. Path.* 1948, Mar., v. 24, No. 2, 339–65, 11 figs. on 5 pls. [19 refs.]

The authors describe a case of systemic blastomycosis, of the North American type, in a male negro aged 20. The signs and symptoms were: mild afternoon pyrexia with night sweats and blood-streaked sputum, and an X-ray picture of miliary nodules scattered throughout both lungs; these seemed to justify the diagnosis of pulmonary tuberculosis, although the tubercle bacillus had not been found in the sputum. The development of multiple, tender cutaneous nodules might have suggested another disease, but the onset of mental symptoms with signs of an intracranial lesion prompted the diagnosis of tuberculous meningitis. Before death, however, *Blastomyces dermatitidis* was found in the pus of a subcutaneous abscess.

A brief account is given of the post mortem findings, the most interesting of which was the lesion on the brain. In the region of the superior sagittal sinus the under surface of the dura mater was closely adherent to a yellowish, friable mass, 2 to 12 mm. deep and about 3 cm. wide, consisting of a granulation tissue and inflammatory exudate of polymorphonuclears, lymphocytes, plasma cells and macrophages, with numerous spherules of the fungus *B. dermatitidis*. The brain cortex was necrosed to a depth of several millimetres over the mesial and upper surfaces of the occipital and parietal lobes, and the leptomeninges on the base of the brain, the cerebellum, pons and medulla oblongata were covered by a tenacious, thick, yellowish-green exudate.

In the primary cultivation of the fungus from pus, colonies were obtained on blood-agar after 4 days' incubation at 37°C., but, on glucose-agar, at room temperature, a more typical mycelial form developed in from 7 to 16 days.

Two strains of *B. dermatitidis* were found to be resistant to penicillin and streptomycin in culture when these antibiotics were present in the culture medium at a concentration of 200 units per ml. *J. T. Duncan*

BONNE, C., BRAS, G. & VERHAART, W. J. C. **Localized Lesions of the Meningi and the Brain caused by a Brown Fungus with Septate Hyphae of Unknown Nature.** *Med. Maandblad.* Batavia. 1948, June 1, No. 23, 465–7, 4 figs. on 2 pls.

TROPICAL OPHTHALMOLOGY

A Review of Recent Articles. LI*

Blindness.—The report on *Blindness in British African and Middle East Territories*[1] is divided into three parts.

Part I deals with statistics of blindness, the social condition of the blind, the medical services, the causation of blindness, education of the seeing and the blind, and the training, employment and after-care of the blind.

Part II deals with a scheme of blind welfare; the administrative organizations capable of giving effect to a plan of development; voluntary organizations; finance; registration of the blind; prevention of blindness; propaganda; education of the blind; vocational training; employment and Braille production.

The Appendices give details of the institutions for the blind in the Colonies visited; registration; a description of a Colonial medical department; a mobile ophthalmic unit; curriculum in a school for the blind; native industries suitable for the blind; Braille printing unit for colonial use.

The investigation carried out by the Joint Committee appointed by the Colonial Office and the National Institute for the Blind reveals that there is a real problem of blindness in the Colonies and that seventy-five to eighty per cent. of the blindness is preventable. The report suggests a scheme of prevention of blindness, treatment of blindness and the education, training and employment of the young blind. This scheme can be put into operation without delay and has possibilities of wide expansion.

The Report is an excellent summary of the blind problem in British African and Middle East territories, and by those interested in the subject it should be read *in toto*.

The causes of blindness in *China* are discussed by Flowers[2]. It is generally agreed that the incidence of blindness is high, but it is strange that so little has been written on the possible causes of this high incidence. The surveys on which we are mainly dependent for evidence cover hospital out-patients in particular centres and are made by busy ophthalmologists. Valuable and reliable as these are, they can only give us part of the story and cover only a short span of time.

From the statistical reports of Chang, Cunningham [*Bulletin of Hygiene*, 1937, v. 12, 208], Shen, and Ling [this *Bulletin*, 1924, v. 21, 459, 983] it would appear that the following diseases are the most important causes of blindness in China:

(1) Ulcerative keratitis of unknown origin. In all the reports, a high proportion of eyes are blinded by this disease. Acute conjunctivitis, including the damaging muco-purulent form, is one of the most frequent eye diseases seen in the average hospital in China and is the original cause of most of the corneal ulcers. The organisms which are most frequently found are the Koch-Weeks bacillus, the pneumococcus, and the gonococcus. Muco-purulent conjunctivitis is commonly associated with trachoma, the one aggravating the other.

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*For the 50th of this Series see Vol. 45, pp. 646–648.

[1] Colonial Office. Blindness in British African and Middle East Territories. Being the Report of a Joint Committee appointed by the Colonial Office and the National Institute for the Blind, following the visit of a Delegation to Africa and certain British Middle East Territories between July, 1946, and March, 1947 [Heath, D. F., Thomas, Mary G. & Wilson, J. F.]. pp. xii + 99, 1 fig. 1948. London: H.M. Stationery Office. [2*s.*]

[2] Flowers, W. S. Causes of Blindness in China. *Chinese Med. J.* Shanghai. 1948, Jan., v. 66, No. 1, 38–46.

(2) Trachoma. Along with Egypt and India, China must be regarded as the home of trachoma and this disease must be considered as one of the major causes of blindness, if not the principal one. A very high proportion of China's population is infected with either acute or chronic trachoma which produces blindness directly from its numerous complications or sequelae or by providing the fertile soil on which more acute infections flourish. It is probably not the most important cause of blindness in the young. Its damaging effects are mainly produced in adults, as a result of prolonged irritation and scarring.

(3) Phlyctenular conjunctivitis. Ling regards this disease, next to trachoma, as the most common eye disease, affecting young people of either sex. It often attacks both eyes and tends to recur over a period of months or years. The disease is an expression of the debilitated constitution of the patient and is mainly found among the poorer classes. In the majority of cases the Mantoux tuberculin test is positive.

(4) Syphilis. It would appear that this disease is not a common cause of blindness and that congenital syphilis is a comparatively rare disease. It is probable that in the large cities nearer the Eastern seaboard, where syphilis is so widespread, it is a much more frequent cause.

(5) Keratomalacia. This disease must be regarded as one of the important causes of blindness in children under ten years of age and is due to the prevailing malnutrition resulting from war.

(6) Gonorrhoea. Many infants lose their vision from this disease, as a result of delivery by untrained midwives. Credé's prophylactic treatment of instilling a weak solution of silver nitrate drops in the eyes of newborn babies immediately upon delivery is not generally practised in China. Blindness in adults from acquired gonococcal infection is, however, much commoner than that from ophthalmia neonatorum, but it is highly probable that large numbers of infants lose their sight from this cause but are never referred to a hospital for diagnosis and treatment.

(7) Acute infectious fevers: smallpox and measles. These diseases are probably not uncommon causes of blindness, particularly in the north and in country districts, but the figures produced by different writers are conflicting and the true picture will only be ascertained after fuller surveys have been carried out.

(8) Trauma. Since the large majority of China's population are agriculturalists, there is comparatively little traumatic blindness.

(9) Cataract. This is probably the commonest cause of blindness in old people and a high proportion of cases are complicated by the lesions resulting from chronic trachoma.

(10) Glaucoma. This is also a fairly common cause of blindness among the adult population. In a large number of cases the disease is undiagnosed and, when the patients present themselves for treatment the condition is inoperable.

(11) Hereditary and congenital defects. These are considered to be uncommon factors in the causation of blindness in west China.

The indirect causes of blindness in China may be summed up as ignorance, poverty, malnutrition, neglect of vaccination against smallpox, and the lack of adequately trained midwives to safeguard the eyes of the newly born.

Surgery.—Recent advances in cataract surgery are reviewed by GILL[3]. He advocates the following technique for the extraction of the lens in capsule. The pupil is dilated by instilling two drops of 0·2 per cent. scopolamine hydrobromide in the conjunctival sac. Akinesia is produced by the van Lint method. A lid speculum is not used. The lids are held open by silk sutures. The upper suture is placed under the superior rectus muscle 4–6 mm. behind its insertion.

[3] GILL, E. G. Cataract Surgery: Recent Advances. *Southern Med. J.* 1948, Mar., v. 41, No. 3, 191–8, 9 figs. [14 refs.]

The lower suture is placed through the skin of the lower lid near the lid margin. A full 180 degrees concentric conjunctival flap is dissected down 3 mm. from the corneal limbus. Double-armed corneo-scleral sutures are placed at 1 and 2 o'clock with No. 6·0 silk in atraumatic needles. Conjunctival sutures are placed at 10, 12 and 2 o'clock. The section is made at the limbus with a specially devised keratome which is 14 mm. in width at its base. The incision is widened to the horizontal meridan with scissors. If an iridectomy has been decided upon, it is performed at this point. The final step in the operation is the extraction of the lens in capsule by the head-on or Verhoeff method. The zonular fibres are ruptured by point pressure at 4, 6 and 8 o'clock. Gentle pressure is made on the iris at 3 and 9 o'clock with a small iris repositor. Firm continuous pressure is made on the limbus at 6 o'clock. When the lens presents itself in the wound it is grasped by Verhoeff capsule forceps and delivered by continuous pressure from below. The sutures are then tied and 1 per cent. atropine is instilled in the conjunctival sac. The patient is generally allowed out of bed twenty-four hours after operation. The author claims that by this technique 90 per cent. of his cases achieved a visual acuity of 20/25 or better. Haemorrhage has been reduced to 3 per cent. and vitreous loss to 2 per cent.

A new operation for entropion and trichiasis of the upper eyelids is described by MASCATI[4]. The technique is as follows : Before commencing the operation, the surgeon should study very carefully the arrangement of the displaced lashes and should keep in mind their position. A light scratch with a very sharp knife is made, parallel to the upper lid margin, slightly above the position of the hair follicles. The ends of this scratch should extend a little farther away than the last mal-placed hair on either side. This scratch is meant only as a mark and should not include the whole thickness of the skin. A second scratch is made below and parallel to the first and the incision goes right down to the subcutaneous tissue. A third scratch is made above and parallel to the first one so as to include a strip of skin, the breadth of which should be about 2 mm. more than the distance between the first scratch and the grey line. A fourth scratch is now made exactly on the grey line, splitting it to the length of the first scratch. A tunnel is made through the split grey line up to the first scratch. The strip of skin between the first and third scratches is freed from above and at the sides, leaving it only attached to the upper border of the first scratch. All subcutaneous epidermal tissues are removed from the freed strip to make it as thin as possible. The strip is then drawn through the tunnel and stitched to the grey line with interrupted sutures. The upper edge of the third scratch is then sutured to the lower edge of the second scratch.

Trachoma.—Trachoma in Changsha, Hunan, is reviewed by Chen-Chung WU[5]. This disease is one of the common chronic diseases in China and is also one of the most important medical and public health problems, since it causes blindness either directly or indirectly. Out of 1,340 outpatients attending the Department of Ophthalmology, National Hsiang-Ya Medical College and Hospital, between September 1946 and March 1947, 1,017 (75·88 per cent. suffered from trachoma. Of these cases 29·43 per cent. were mild cases, 67·26 per cent. were moderate and 1·31 per cent. were severe cases. The highest age incidence is between 10 to 40 years. Occupational incidence ranks highest among students and teachers, then merchants, housewives, etc. Most cases are in Stage 2 (MacCallum's classification) and moderately severe. A list of common complications and sequelae is presented, and pannus heads the list. Two hundred and sixty-five of the 1,872 eyes seen were blind.

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[4] MASCATI, N. T. A New Operation for Entropion and Trichiasis of the Upper Eyelids. *Indian Med. Gaz.* 1948, Feb., v. 83, No. 2, 79–81, 9 figs.

[5] WU, Chen-Chung. Trachoma in Changsha. *Chinese Med. J.* Shanghai. 1948, Mar., v. 66, No. 3, 144–7. [16 refs.]

Malaria.—Migraine due to malaria is reviewed by SÉDAN[6]. He reports a case which had a bilateral scintillating scotoma followed by a temporary blindness. This was accompanied by a total paralysis of the right third cranial nerve. The fundus revealed ischaemia with spasm of the retinal arteries. The veins appeared normal. The macula appeared to be more coloured than the rest of the retina, probably more in contrast than effect. The case cleared up quickly on one intravenous injection of quinine. The paralysis lasted longer than the blindness, but the eye became normal by the end of the second week of treatment.

The author considers the case worthy of publication for the following reasons: Spasm of the retinal arteries as a result of malaria is very uncommon. Its association with an ocular palsy, so far as he knows, has not been reported. The action of quinine in the cure of the blindness, the headache and the paralysis was remarkably rapid and so rules out the possibility that these complications are due to quinine therapy. Although these ocular manifestations are at the time alarming the author considers they are benign and clear up on treatment.

Leprosy.—A case of iridocyclitis leprosa imported into Denmark is described by BARDRAM[7] in a man aged 41 years, who had spent 15 years in the East. He first developed a localized eruption of leprosy on the left upper arm. Four years later he developed a general eruption of the anaesthetic type and this was followed four years later by a bilateral iridocyclitis with increased tension and lepromata on the left iris. The ocular signs progressed in spite of improvement in the skin affection and the vision deteriorated. It was not possible to follow the further progress of the disease as the patient returned to the East.

The author points out that the eyes are often affected in leprosy and that these complications are serious. The cornea is the part of the eye most frequently attacked. Iritis is always found together with affections of the cornea and occurs after the cornea has been invaded. The iris may, however, be the seat of primary attack. The disease follows a slow relentless course with periods of improvement and exacerbation, but the prognosis is grave and the presence of lepromata considered to be a special sign of the malignity of the disease. According to some authors, lepromata may be the first sign that the disease is passing from the tuberculoid to the lepromatous form.

Disagreement prevails with regard to the way in which the infection enters. Some assume the infection to be exogenous through conjunctiva and episclera, some that it is secondary to a nasal focus, but most authors on the basis of microscopy and clinical investigation consider that the infection is endogenous with a primary lesion in the anterior part of the ciliary body and at the circulus iridis major from which it spreads to the iris, sclera and cornea, while the posterior part of the eyeball is rarely attacked. *E. O'G. Kirwan*

MACCHIAVELLO, A. El virus del tracoma y su cultivo en el saco vitelino del huevo de gallina. [**The Virus of Trachoma and its Cultivation in the Yolk Sac of the Hen's Egg.**] Reprinted from *Rev. Ecuatoriana de Hig. y Med. Trop.* Guayaquil. 1944, Apr., v. 1, No. 2, 33 pp. [106 refs.]

Macchiavello's experiments which resulted in the culture of trachoma virus in the yolk sac of the hen's egg can be summarized as follows. [The following standard abbreviations are employed.—I.B.=Initial body, intracellular, basophil, measuring 1·0—10·0μ; P.K.=Prowazek-Halberstaedter body, consisting of a basophil vesicular cover enclosing a mass of acidophil elementary granules (E.K.). The P.K. measures more than 10μ, the E.K. 0·25 to 0·30μ.]

[6] SÉDAN, J. Migraines ophtalmoplégiques et angiospasmes récidivants du paludéen. *Rev. Paludisme et Méd. Trop.* 1948, June 15, v. 6, No. 49, 165–70.

[7] BARDRAM, M. T. A Case of Iridocyclitis Leprosa. *Acta Ophthalmologia.* 1947, v. 25, No. 3, 265–9. [15 refs.]

(I) The source of the virus was a young man M. A., aged 17, who had suffered from a disease diagnosed as trachoma for three years. When seen by the author this was in stage Trachoma II, with reddened conjunctiva and follicles. The cornea was not affected. Indigenous trachoma is not known in Ecuador although immigrants, usually Syrians, carry the disease. M.A. had not been in contact with such cases. Scrapings of the conjunctiva of M.A. showed the classical inclusion bodies.

Follicles removed from his conjunctiva were finely divided with scissors and emulsified in Tyrode solution. This emulsion was used unfiltered for the inoculation of seven eggs, in the yolk-sac according to Cox's method [see this *Bulletin*, 1942, v. 39, 381]. The eggs had previously been incubated for 3, 6 or 9 days. On the 3rd day after inoculation, four of the eggs were examined. Three were found contaminated and were discarded, while study was concentrated on the fourth containing a 9-day embryo (*i.e.*, it had been incubated 6 days before inoculation). In films made from the wall of the yolk sac the following bodies were found: (1) Initial bodies; (2) larger basophil bodies containing acidophil granules, *i.e.*, P.K.; (3) rare E.K.; (4) free in the yolk a few vesicular P.K. were found. No traces of virus were found in the albumin, in the chorio-allantoic membrane or other membrane. *Cultures on bacteriological media remained sterile.* (II) The remainder of the yolk-sac of this egg was washed in broth, triturated in a mortar, re-suspended in Tyrode and divided into two halves, of which one was filtered through a Seitz E.K. membrane, the other left unfiltered. With each half, 8 eggs of 5–6 days incubation were inoculated.

The eggs inoculated with unfiltered suspension were found to be contaminated and were discarded.

Of the eggs inoculated with filtered suspension two were examined on the 6th day and showed a good development of virus. One was examined on the 23rd day (the embryo was then at term, having been delayed in development by the virus) and it showed abundant E.K. In subsequent passages the most abundant infection was always found on the 23rd day. From this (filtered) source subcultures were made by Cox's method through 9 generations, the material being filtered if contamination appeared. The 9 generations occupied from the 5th January 1943 to the 7th March 1943.

Filtration of the emulsion of yolk-sac through a Berkefeld N or Seitz E.K. filter was successful if the virus had reached the stage of E.K., but not if still in the plaque or morula (I.B.) stage. Retention was probably due to a matrix containing glycogen. [It should be noted that virus taken direct from the man M. A. proved unfilterable, that filterability began after infection of the egg.]

(III) Experimental transmission of trachoma from the egg to man. An emulsion of a yolk sac of the 9th passage which was rich in E.K. was filtered through a Berkefeld N candle. One drop of this filtrate was instilled into the eye of a boy aged 6 years. Six days thereafter there was reddening of both eyes with lachrymation and photophobia. These symptoms persisted for 3 days (from 7th to 9th) but were absent between the 10th and 14th days. On the 15th day after infection they recurred more severely and simultaneously in both eyes. The conjunctiva was intensely red and oedematous, lachrymation and photophobia were marked. Feverish reaction and diarrhoea lasting four days occurred. After the 21st day, there was considerable vascular infiltration of the cornea which appeared definitely opaque. Treatment with sulphathiazole was then carried out. At the end of two months from infection, the conjunctiva and cornea were nearly normal in appearance and after one year there was no change, sight was perfect and there was no ptosis.

During the period of observation, scrapings were taken daily from this child's eyes with the following results. From the 6th to the 10th day, during

the first period of conjunctivitis, no inclusions or virus bodies of any kind were found. From the 10th to the 15th days during regression, numerous free basophil dots and a few basophil inclusions were found. From the 15th to the 18th days the conjunctival cells were filled with granules of various sizes. After the 18th there were fewer I.B. inclusions, E.K. were beginning to appear in the centre of these bodies, and by the 25th day they had become typical P.K.

Three times during the acute stage, on the 8th, 16th, and 19th days, cultures into eggs were made from unfiltered and from filtered secretion. Only the unfiltered material in the last two experiments proved infective. On the 24th day, both eyes were washed out thoroughly, secretion was collected and filtered through a Berkefeld N and injected into 4 eggs, all of which yielded a great multitude of E.K. when examined between the 4th and 7th days.

[Dr. Macchiavello is to be congratulated on the very interesting results of his work. But as there appears to be some doubt whether the disease with which he dealt was identical with trachoma of the Eastern hemisphere, the experiments should be repeated.] *F. H. Stewart*

Sousa e Faro. A epidemia de tracoma no arquipélago de Cabo Verde. [**Outbreak of Trachoma in the Cape Verde Islands.**] *Gaz. Méd. Portuguesa.* 1948, v. 1, No. 1, 191–5. English summary.

In August, 1943, the author was sent to the island of Sal to investigate an outbreak of trachoma which had appeared among soldiers of the garrison. He found 349 cases, 20 in native soldiers. Of the other 329 there were 157 in the first stage (of McCallan), 169 in the second, 3 in the third. So far as could be ascertained, the first case had occurred at Praia, a town of the island of St. Iago, and thence the infection had spread by manual contact, by the common and promiscuous use of towels and other personal belongings, and by the agency of flies, for the place was hot and dusty. The civil population could, naturally, not be isolated, but those with trachoma were confined to certain houses under supervision and careful hygienic conditions—careful washing of hands; towels, clothes, etc., restricted to personal use; keeping down flies; and the treatment of patients with copper sulphate, nitrate of silver, sulphathiazole, cyanide of mercury, and treatment of any concomitant disease.

H. Harold Scott

HEAT STROKE AND ALLIED CONDITIONS

Lee, D. H. K. & Macpherson, R. K. **Tropical Fatigue and Warfare.** *J. Applied Physiol.* 1948, July, v. 1, No. 1, 60–72.

Much of the morbidity experienced in the tropics can be attributed to specific "tropical diseases", but there has remained a rooted conviction that there is a residuum of morbidity directly attributable to exposure to extremes of heat and humidity, and to this the term "tropical fatigue" has been applied. This so-called "tropical fatigue" assumed considerable relative importance as a cause of disability in tropical warfare, and about the middle of 1944 it was decided to investigate its nature and incidence amongst military personnel serving in the Southwest Pacific Area.

It appeared that if tropical fatigue existed it might be either a physical or mental phenomenon, or a combination of both. Since psychological methods of investigation did not appear suitable for use in a field survey, it was decided to concentrate on the physiological aspects, and to treat mental aspects largely by a method of elimination.

The approach adopted was to record the opinions of commanding and medical officers as to the efficiency of personnel in relation to the length of tropical service, to measure by suitable tests their physical condition and to relate the measurements to the length of tropical service, and to estimate the importance of psychological effects by comparing physical deterioration with the loss of efficiency reported.

To test cardio-vascular reactions to acute maximal exercise the Harvard Pack Test was used. The subject wears a pack weighing one-third of his body weight and steps up on to and down from a platform 16 inches high once every two seconds until he can no longer maintain the pace or until five minutes have elapsed. The index is then calculated from the quotient when the duration of the exercise is divided by the sum of pulse counts after the exercise.

$$I = \frac{100 \times \text{Duration in seconds}}{\text{Twice sum of pulse beats counted 1 to } 1\frac{1}{2}\text{, 2 to } 2\frac{1}{2}\text{, and 4 to } 4\frac{1}{2} \text{ minutes after cessation}}$$

It was concluded that there was a general lowering of efficiency in R.A.A.F. ground crew surveyed in tropical areas as compared with those examined near Brisbane. Beyond a slight initial loss of weight, the only objective evidence of deterioration in physical fitness was that given by the Harvard Pack Test Index, which showed a net fall of 0·19 units per week of tropical service. This is a small effect but it may assume importance after 12 months or so. The index was significantly correlated with the subject's own estimate of his efficiency, and with length of previous tropical exposure.

There was an extensive incidence of skin affections.

It was evident to the authors that the degree of physical deterioration found was quite inadequate to account for the marked loss of general efficiency apparent in the ground crew. Members of the Australian military forces exposed to a physical environment no better than that to which the ground crew were subjected showed smaller loss of efficiency, and this is taken to support the conclusion that physical effects play a relatively small part in causing the deterioration observed. This leads to the conclusion that the major part of the deterioration is due to psychological causes.

The influence of various psychological factors is discussed, and it is remarked that, by attention to sound principles, psychological deterioration can be avoided, or reduced to a minimum, in civilian settlements in the tropics.

T. Bedford

TROPICAL ULCER

Catrysse, R. M. Note sur le traitement de l'ulcère phagédénique tropical. [**The Treatment of Tropical Phagedaenic Ulcer.**] *Ann. Soc. Belge de Méd. Trop.* 1948, Mar. 31, v. 28, No. 1, 1–5, 2 figs. on 1 pl.

The author treats tropical phagedaenic ulcers by a method based on the technique of Winett-Orr. Under general anaesthesia, for which sodium pentothal suffices, the ulcer is vigorously curetted and the margins excised with curved scissors until a healthy bleeding surface is produced. Compresses of sterile vaseline gauze are then placed on the wound and the whole is enclosed in a plaster-of-paris-case, without window. Seven days later the plaster is removed and the wound is dressed for several days with mercurochrome and sulphanilamide powder, until it appears free from infection. In cases of large and heavily infected ulcers it may be necessary to repeat the curetting and plaster treatment. Finally the wound is covered with skin grafts, which are left undisturbed for 10 days.

The author has treated 41 cases by this method, with successful results in all cases, although some of the ulcers were of 15 to 20 years' standing.

[Treatment by occlusive dressings, after cleansing and applying sulphanilamide powder, was one of the methods recommended by the War Office for the treatment of desert sores during the 1939–45 war.] *W. L. Harnett*

CASTELLANI, A. **Tropicaloid Ulcer (Mycetoid Ulcer, Superficial Tropical Ulcer).** *An. Inst. Med. Trop.* Lisbon. 1947, Dec., v. 4, 297–312, 14 figs. on 4 pls.

This is an amplified account of that given in the author's recent book on the Diseases of Africa (*Le Malattie dell'Africa*) published in Rome in 1946. The condition differs in several respects from ulcus tropicum, veldt sore and other forms of ulcer, though resembling them in some points [hence, it is presumed, the name " tropicaloid "]. Cases were seen by the author in Libya during the late war when he met with it under the names Marmarica ulcer, or oasis ulcer. The causative organism isolated and named by the author is the *Micrococcus mycetoides*; coccoid forms being 0·6–1μ in diameter and cocco-bacillary forms 0·6–2μ long and 0·3–0·6μ broad. It is Gram-negative when first isolated, but later becomes positive and yet later still returns to the Gram-negative state. It is usually found mixed with other organisms, staphylococci and diphtheroid bacteria. According to the author growth on Italian agar is not profuse and produces no pigment, but on Portuguese or American agar a yellow pigment is formed; in liquid media, broth and peptone water, growth is scanty; it does not liquefy gelatin; it produces acid in glucose, laevulose, lactose, maltose, saccharose and galactose, but not in mannitol, and no gas in any. Inoculation on the scarified skin of volunteers, or to small wounds, was followed in 10–12 days by typical ulcers which, like the natural ulcers, took 3 months or so to heal, leaving either pigmented scars or infiltrated plaques. Similar inoculation with the associated organisms resulted only in small inflammatory lesions which crusted over and healed completely in 2–3 weeks. The ulcer may be tender on pressure, but is not usually painful; there may be one to four of them, usually in the leg, each 1–4 cm. in diameter, with a reddish, granulating base and an inflamed periphery, edges not raised or undermined. There is no lymphangitis or corresponding lymphadenitis. Apart from the superficial types, nodular or more infiltrated types are seen and also eczematoid crusted and pyodermic types. [In his book the author gives in more detail the points in diagnosis between this and other forms of ulcer: ulcus tropicum, veldt sore (Barcoo rot), yaws, leishmaniasis, leprosy, mycotic ulcers, varicose, syphilitic, tuberculous and trophic forms.]

The best treatment seems to be the simple one of rest, boric acid fomentations, followed by a " dermatol " ointment, or iodoform and benzoin. Sulphonamides were tried without much success, but penicillin was more satisfactory in a few cases. The article has some excellent photographs showing the natural condition and that seen in the inoculated volunteers.

H. Harold Scott

MISCELLANEOUS DISEASES

ALKAN, W. J. **One Year of Military Medicine in the Central Mediterranean Area.** *Acta Med. Orientalia.* 1948, Apr., v. 7, No. 4, 76–82.

This is a review of 3,852 patients treated in hospital from July 1945 to June 1946, of whom 1,657 were in two hospitals in Italy (1945) and 2,195 in Greece

(1946). Fifty per cent. of these suffered from infectious diseases, all, with the exception of about 250 prisoners-of-war, being young and healthy men. The most interesting groups of cases are described in detail.

The distribution was as follows :—

Malaria	Italy	Greece	Total
Benign tertian (primary)	29	18	47
Benign tertian (relapse)	77	9	86
Malignant tertian (primary)	3	—	3
Malignant tertian (relapse)	1	—	1
Clinical malaria	3	2	5
Total	113	29	142

The low incidence of malaria is thought to have been due mainly to suppressive administration of mepacrine. *Plasmodium vivax* infections, as compared with those caused by *Plasmodium falciparum*, appeared to show relapses in a larger proportion of cases after the drug was discontinued, but some of the so-called relapses were probably re-infections. Every effort was made to diagnose cases microscopically before beginning treatment.

Bacillary dysentery : This was commoner in Greece, the disease being always of a mild type. There were 103 cases. Sulphaguanidine appeared to shorten the illness.

Amoebiasis : The figure of 67 cases is considered to be too low, as it was found to be impossible in practice to re-examine microscopically every diarrhoea stool, but the need for the most careful investigation of all patients where this infection is suspected is stressed, and sigmoidoscopy was done on all the cases of amoebiasis before discharge. It was found that fresh cases intensively treated from the beginning showed comparatively fewer relapses than the more chronic ones.

Enteric fever : Six cases were seen ; this is striking evidence of the efficiency and thoroughness of preventive inoculation with T.A.B. vaccine.

Miscellaneous infectious diseases : There were 1,390 cases : the most common were infective hepatitis and " short-term " fevers. The former (240 cases) was usually a mild infection and a number of cases of hepatitis without jaundice were seen. These patients were given a diet low in fat, rich in proteins and carbohydrates, with a minimum of roughage. Of the short-term fevers (472 cases) a large number were typical sandfly fever and only 1 case of dengue was seen. Of 554 cases of respiratory affections, the most interesting group was primary atypical pneumonia (149 instances). There were 106 patients with pulmonary tuberculosis, 45 being prisoners-of-war.

Warnings were given against the use of sulphonamides in eczematous conditions. Psychosomatic disorders (gastro-intestinal, respiratory, cardio-vascular and urogenital) accounted for 71, and pure psychoneuroses for 121 cases. Sixty-eight patients were admitted without any definite illness being found, but there appeared to be no definite evidence which would label these as malingerers. *C. F. Shelton*

DAVIES, J. N. P. **Pathology of Central African Natives. Mulago Hospital Post Mortem Studies—VII.** *East African Med. J.* 1948, June, v. 25, No. 6, 228–35. [20 refs.]

This series, which is concerned with causes of death in African children, consisted of 164 children under the age of 10 years divided into three groups according to the usual convention.

Group I.—Neonates, 26 children under the age of 28 days. The most common single cause of death was infection, mainly pneumococcal. In none of the cases was evidence of syphilis found, nor is malaria reported as a cause of death.

Group II.—Infants under the age of 12 months. This group consisted of 38 children. Malaria was a cause of death in only 6 cases. As a direct cause of death it does not appear to be of significance, though it may act indirectly by undermining resistance. Only one case of syphilis was observed. Again, infection, particularly pneumococcal, was the most common cause of death. Of 6 cases of purulent meningitis, four resulted from the pneumococcus. Most of the children showed evidence of malnutrition, but in only 3 was it marked and considered a cause of death.

Group III.—Children from 1 to 10 years. This group contained 100 children and in them multiple disease manifestations occurred, rendering it difficult to determine the exact cause of death. Infections, malnutrition and malaria were often associated.

Malnutrition lay at the background of most cases. "Nearly every African liver shows signs of a fine monolobular cirrhosis with portal cell accumulations. This suggests that nearly every African child goes through a kwashiorkor phase." The importance of malaria as a cause of death was slight; infections were responsible for the greatest number of deaths, the pneumococcus being the chief offender and the tubercle bacillus a close second. There seems to be no distinction between childhood and adult tuberculosis in Uganda; all cases seem to show the characteristics of primary infections. Of "tropical" diseases there were only 9 cases of malaria, 2 of amoebiasis and 6 of plague. Five cases of neoplasm and one of malignant hypertension were noted. Syphilis does not appear in the list of findings and a feature was the unimportance of helminthic infections.

[The paediatrician in Kampala would find that his problem did not lie in the field of tropical medicine, but in the cosmopolitan diseases of childhood.]

P. A. Clearkin

MILNE, J. C. **A Brief Review of Fifty Years of Medical History in Selangor, Federation of Malaya.** *Med. J. Malaya.* 1948, Mar., v. 2, No. 3, 161–73.

This is an interesting piece of Colonial history, compiled, one presumes, from official reports. It cannot satisfactorily be summarized. The author deals with his subject under various heads: hospitals, health legislation, dangerous infectious diseases, prevailing diseases, beriberi, fever and malaria, dysentery, and diarrhoea, influenza and enteric fever.

In a table are given the numbers of cases of smallpox, cholera, plague, beriberi, dysentery, diarrhoea and fevers reported each year from 1890 to 1939. The only one of these to show steady reduction is beriberi, which began to decline from figures over 2,000 per annum before the 1914–18 war to 69–444 per annum from 1930 to 1939. Plague was never common and neither cholera nor smallpox was responsible for large numbers of cases.

The author does not give any systematic accounts of the outstanding investigations made during the period, but rather quotes opinions expressed by Government servants, medical or lay, in their reports. *Charles Wilcocks*

Casis Sacre, G. Impresiones parasitológicas a través del Seguro Social Mexicano. [**Parasitism in Mexico.**] *Medicina.* Mexico. 1948, July 25, v. 28, No. 560, 318–24.

The staff of the Social Security Service in Mexico has been inquiring into the existence and prevalence of parasitic infections in the State. The general conclusions are that intestinal parasites are much more common among the poorer and uneducated classes of society and that, in order of importance, these parasites (and infections) are *Enterobius vermicularis*, *Ascaris lumbricoides*, *Taenia saginata*, *T. solium* and *H. nana*, amoebiasis and giardiasis. Malaria, *Trichuris* infection and uncinariasis cases are comparatively few and usually imported.

Enterobius vermicularis is the commonest infestation ; in Mexico City 80 per cent. of the parasitism is by this worm and it is specially common among those living in poor and insanitary conditions and among the larger families. Treatment by gentian violet, in courses of 8 days with a week's interval, proves satisfactory. *Ascaris lumbricoides* is very common also, again among the poor living in insanitary conditions. It is found even in children less than a year old. Hexylresorcinol is the usual drug for treatment, or, if the children will not swallow this, santonin and chenopodium in castor oil. *Taenia saginata* is more frequently met with than *T. solium*, especially in the Federal District. Cases are probably more numerous than is supposed because patients do not come for treatment unless they see the proglottides themselves, and there exists the peculiar belief that expulsion of the worm as the result of medical treatment is followed by serious after-effects, perhaps even death of the patient ; they prefer to keep their worms year after year. *Hymenolepis nana* is seen, almost exclusively in children. Filix mas is not used in treatment " in spite of its being recommended in the books . . . because, if this medicament is dangerous for adults, it must be more dangerous for children." The author gives atebrin instead.

Intestinal *amoebiasis* has been reported as infecting 5 per cent. of 105 schoolchildren in a residential part of the capital and in 34 per cent. of the inmates of a Children's Home (alumnos de un internado) in the suburbs. How much of this is due to *E. histolytica* is doubtful because, as the author naïvely states, the technical microscopists find it difficult to distinguish *E. histolytica* from *E. coli*. In view of possible liver abscess or other complication, efforts will be made to render the diagnosis more certain and to determine the actual prevalence by examining the faeces of large numbers of the people, by routine examination of the faeces of all patients complaining of diarrhoea or dysentery and " by selecting microscopists whose findings can be received with confidence." *Giardiasis* is reported as present in 10–20 per cent. in Mexico City ; atebrin is used in treatment. *Malaria* is mostly associated with *P. vivax* and is more common than is generally reported because most people regard it lightly and treat themselves ; on the other hand, anyone with fever, particularly if it is rhythmic (periodic) takes quinine or atebrin or plasmoquine without calling in a doctor, or these drugs are prescribed by the doctor without any preliminary blood-examination. *H. Harold Scott*

Symmers, D. **Splenomegaly.** *Arch. Pathology.* 1948, Mar., v. 45, No. 3, 385–409. [37 refs.]

A general review.

Danaraj, T. J. **Eosinophilic Lung.** *Med. J. Malaya.* 1947, June, v. 1, No. 4, 278–88, 2 graphs. [18 refs.]

Eight cases of this condition are described, the patients being four Ceylonese, three Indians, and one Chinese, all males except one. Symptoms consisted of

breathlessness and cough, sputum being sometimes purulent and occasionally blood-stained. Six of the patients complained of loss of weight, and in one, a Ceylonese schoolboy, this was the only presenting symptom. The authors found the most troublesome complaint to be a paroxysmal cough which was always worst at night.

On clinical examination rhonchi were heard scattered throughout both lung fields in five cases, the lungs being clear in the other three. X-ray examination showed characteristic mottling of both lungs in four cases and of one lung in one case; another showed increased vascular markings, while in two the lungs were clear. Sputum was examined for tubercle bacilli and mites but none were found. The technique used for searching for mites is not described. A marked eosinophilia was found in all cases, the highest count recorded being 33,264 eosinophils per cmm.

Treatment consisted of arsenic, given in the form of neoarsphenamine, six injections of 0·3 gm. in six cases, and stovarsol 4 grains t.d.s. for seven and ten days respectively in the other two. Four of the patients were cured, three were improved, while one was showing a favourable response although treatment had not been completed.

The author emphasizes the importance of performing repeated blood counts in order to avoid missing this condition. Out of the eight cases which he describes, one had been wrongly diagnosed as pulmonary tuberculosis and three as bronchial asthma. One of the latter had an initial eosinophil count of 4,092 which rose to 17,700 three weeks later. *H. T. H. Wilson*

ROSEN, A. P. & SCANLAN, J. J. **Favism.** *New England J. of Med.* 1948, Sept. 2, v. 239, No. 10, 367–8.

"A case of favism in a five-year-old boy is presented with a review of the clinical features. More cases of this syndrome will be seen in the United States because the fava bean is now cultivated here."

SEN, S. **A Case of Melioidosis.** *Indian Med. Gaz.* 1948, Apr., v. 83, No. 4, 186–7.

The case occurred in Rangoon.

SIGALAS, R. & PAUTRIZEL, R. Sur quatre cas de myiases souscutanées à hypoderme chez l'homme. [**Four Cases of Subcutaneous Myiasis due to** *Hypoderma.*] *Bull. Soc. Path. Exot.* 1948, v. 41, Nos. 5/6, 380–84.

PROTOZOOLOGY: GENERAL

TALIAFERRO, W. H. **The Inhibition of Reproduction of Parasites by Immune Factors.** *Bact. Reviews.* 1948, Mar., v. 12, No. 1, 1–17, 2 figs. [68 refs.]

This interesting paper is an exposition of certain views regarding the mechanisms restricting unlimited reproduction in parasites and the part played by them in immunity. Much of the most important work on this subject has been carried out by the author and his summary here of this, and of the studies of others in the same field, make a very useful contribution to the subject.

It is not possible in a short review adequately to summarize the contents of the paper and those interested in the subject must consult the original, but a brief account of the salient points will indicate the scope of the work.

Inhibition or impairment of reproduction in parasites brought about by immunity mechanisms must, in the last resort, depend on the effect of the latter in impairing the metabolism of the parasites.

This inhibition of reproduction can be recognized in three forms. The first is exhibited in the case of certain nematodes. Here the immunity mechanism produces its inhibitory effect on reproduction merely as part of a general depression of the metabolic processes of the parasite, but without specific action against reproduction.

In the next form, the immune reaction exercises the same unspecific generalized inhibitory effect on metabolism, including that on reproduction but, in addition, is reinforced by physiological disorganization in the host itself, caused by toxins produced as a result of antigen-antibody reactions. Of this nature is the sum of the immunity responses in malaria.

In the third form, there is a demonstrable and special retarding effect on reproduction, so specific that it leaves the remaining normal metabolic activities of the parasite practically unaffected. This type of inhibition of reproduction is seen in certain non-pathogenic trypanosomes such as *T. lewisi*. The specific antibody producing this effect was described by the author in 1924 and later named "ablastin." It has been the subject of research by a number of investigators. *H. E. Shortt*

VAN CREVELD, S., ARONS, P. & DE BRUYNE, J. I. Toxoplasmosis gecombineerd met situs inversus totalis. [**Toxoplasmosis in a Patient with Situs Inversus.**] *Nederl. Tijdschr. v. Geneesk.* 1948, Sept. 18, v. 92 (iii), No. 38, 2903–9, 5 figs. (4 on pl.).

The English summary appended to the paper is as follows:—

"Description of a case of congenital toxoplasmosis in a girl with complete situs inversus. The diagnosis of toxoplasmosis was founded besides on the presence of characteristic clinical symptoms, on the result of serological reactions. A sister of this girl, born 15 months after our patient, is now 8 months old and till yet shows neither clinical symptoms nor serological reactions of toxoplasmosis."

ENTOMOLOGY AND INSECTICIDES: GENERAL

JAMES, M. T. **The Flies that cause Myiasis in Man.** *U.S. Dept. of Agric. Wash. Misc. Publication No. 631.* 1947, Sept., 175 pp., 98 figs. [160 refs.]

This publication provides a general review of the subject of myiasis in man, followed by a systematic consideration of the species of flies involved. It is an extremely valuable general account of the subject.

In the first thirty pages, the author discusses the classification of myiasis, a rather amorphous subject. Patton, as will be remembered, grouped his insects into those of which the larvae are specific and obligate parasites of man (or other vertebrate), secondly those which are semi-specific (normally breeding in dead material but occasionally living in diseased tissues on a living host), and thirdly those of which the larvae occur accidentally in the gastro-intestinal tract (or other passages). Bishopp and others on the other hand have adopted a classification based on the organ or tissue affected: this suits the surgeon, but the entomologist rightly objects, because a particular insect may parasitize several organs and appear in several places in the classification. In the present work, the author uses a rather full classification based on site and organs, but sets out most of his data under genera and species. His general discussion of

types of myiasis is full and valuable: it is under such headings as traumatic myiasis; myiasis of nose, mouth, etc.; aural myiasis and so forth.

The general part of the work contains enough entomology to make the publication self-contained: there are condensed accounts of the anatomy of the adult and larva of the Diptera, followed by keys which deal only with those forms which may cause myiasis. There are also notes on rearing maggots on synthetic media, and on other matters of technique.

The bulk of the paper, some 130 pages, deals with these insects in a taxonomic way. Where necessary, keys to genera and species are provided, and there are many illustrations of flies, maggots and details of anatomy. Under each species the author gives the characters by which it may be recognized, the geographical distribution (in considerable detail), life history, pathological importance, and a few selected references to literature. The author is critical of many published records. He includes a brief consideration of certain species which are of known veterinary significance and which might infest man. In this section there is an immense amount of information.

The author is to be congratulated on having been selective, and on his brevity. But it is to be regretted that he completely passes over the interesting and important work carried out at Freetown on "metazoan immunity" against larvae of *Cordylobia*. A section on the treatment of myiasis (which may be a most urgent matter, and which is neglected in standard text books) should have been included. *P. A. Buxton*

DE MEIRA, M. T. V., SIMÕES, T. S. & NOGUEIRA, J. F. P. Observações sobre a fauna entomológica das Ilhas do Sal, Boa Vista e S. Nicolau (Cabo Verde). [**Insects on the Cape Verde Islands (Sal, Boa Vista and S. Nicolau).**] *An. Inst. Med. Trop.* Lisbon. 1947, Dec., v. 4, 257–67, 12 figs. on 3 pls. [13 refs.] English summary (8 lines).

The authors spent three months (November to January) collecting insects on several of the Cape Verde Islands. Their most interesting captures were *Anopheles gambiae, A. pretoriensis, Aëdes aegypti, Auchmeromyia luteola, Tunga penetrans*. They did not find *A. funestus*, or any species of *Glossina*. The paper contains notes of local interest. *P. A. Buxton*

COLAS-BELCOUR, J. & MILLOT, J. Contribution à l'étude des ixodidés de Madagascar. Sur une variété nouvelle de *Haemaphysalis hoodi*. Parasitisme humain par un *Boophilus*. [**The Ixodid Ticks of Madagascar. A New Variety of *H. hoodi*; Parasitism of Man by a Species of *Boophilus*.**] *Bull. Soc. Path. Exot.* 1948, v. 41, Nos. 5/6, 384–8, 2 figs.

BRUMPT, E. & CHABAUD, A. G. L'infestation par des ixodines provoque-t-elle une immunité chez l'hôte? I. Note préliminaire. [**Does Infestation by Ixodid Ticks provoke Immunity?**] *Ann. Parasit. Humaine et Comparée.* 1947, v. 22, Nos. 5/6, 348–56.

The authors describe a number of experiments with various animals in an attempt to determine whether an infestation with tick larvae produced acquired immunity in the animals which prevented subsequent batches of tick larvae from engorging.

The accumulated data are tabulated and the results discussed. From these it is concluded that the phenomenon is not a general one and that no immunity is induced in the rabbit by either *Hyalomma excavatum* or by *H. dromedarii*. This may be true also in the case of *Rhipicephalus sanguineus* and *R. bursa* and the dog, but the results are not conclusive. The authors are prepared to admit

provisionally that in one experiment *Dermacentor pictus* induced an immunity in the rabbit, but there was no cross immunity when *Hyalomma detritum* was used.

Incidentally, the occurrence in France of *Hyalomma excavatum* is recorded for the first time. *H. S. Leeson*

CULPEPPER, G. H. **Rearing and Maintaining a Laboratory Colony of Body Lice on Rabbits.** *Amer. J. Trop. Med.* 1948, May, v. 28, No. 3, 499–504, 1 fig.

A review of the literature indicates that the body louse (*Pediculus humanus corporis*) has not been successfully reared for more than two generations without human blood. In this paper the author describes methods, materials and results obtained in the successful rearing of 25 generations of body lice on certain domesticated rabbits.

The lice were kept at 85°C. (29·4°C.) and 60 per cent. R.H. in beakers and Petri dishes, on patches of blue or black woollen cloth approximately 1½ inches square. The patches were transferred to the bare skin of the rabbits, placed on their backs in specially designed stanchions. A photograph illustrates how the rabbits are held. Two feeds a day are sufficient; 1,600 to 4,000 lice can be fed at one time. A colony of 40,000 lice is being maintained on sixteen rabbits, four being used each day.

In initial tests only four out of twenty-five rabbits were found to be favourable hosts, later seven out of ninety-seven were favourable. On favourable rabbits the lice feed to repletion in 12 to 20 minutes, whereas on unfavourable animals the lice attach more slowly and take up to 30 minutes for repletion. By transferring lice of the tenth generation from favourable to unfavourable rabbits a strain was built up which was sufficiently adapted to the unfavourable rabbit to produce a satisfactorily vigorous colony. Lice have been carried through fifteen generations, on unfavourable rabbits, after ten on favourable ones.

Data are given which show that egg production and longevity of rabbit-bred lice compare well with those of lice reared on man, and lice from naturally infested men can be reared on favourable rabbits just as successfully as those from the laboratory colony. There was no difference in susceptibility to pyrethrum and DDT between lice reared on man and those reared on rabbits. *H. S. Leeson*

BARRY, G. T. & BOYER, R. **The Synthesis and Biological Toxicities of some DDT Homologues and related Compounds.** *Canadian J. Res.* Sect. B. Chem. Sci. 1948, July, v. 26, No. 7, 511–17. [14 refs.]

VARGAS, L. Fototropismo positivo en larvas de mosquito intoxicadas con DDT. [**Positive Phototropism in Mosquito Larvae Poisoned by DDT.**] *Rev. Inst. Salubridad y Enfermedades Trop.* Mexico. 1948, Mar., v. 9, No. 1, 47–9.

The English summary appended to the paper is as follows:—

"Mosquitoes *Aëdes* and *Anopheles* show in the adult stage, during the excitation period produced by the poisoning with DDT a strong positive phototropism. The same phenomena can be observed in larvae of *Aëdes aegypti* and *Anopheles pseudopunctipennis typicus*."

ENIGK, K. Die Wirkung neuartiger Insektizide auf Milben. I. Mitteilung: Laboratoriumsversuche. [**The Effect of the Newer Insecticides on Ticks and Mites.**] Reprinted from *Deut. Tierärzt. Woch.* 1948, v. 55, Nos. 5/6 & 7/8, 40–43; 51–6.

The author reviews our knowledge of the effect of the newer synthetic insecticides upon ticks and mites (Acarina), and describes his own experiments.

In his own work the author used a number of substances which are referred to under proprietary names. In nearly all cases the formula of the actual insecticide is quoted, but the methods of compounding [which may so greatly influence the efficacy of the insecticide] are withheld. The insecticides included DDT, a xanthogen, hexachlorcyclohexane, p-chlorphenylchlormethylsulphone, and others; also simpler materials, *e.g.*, sodium arsenate, phenol, etc. The test animals were *Ornithodorus*, *Ixodes*, *Dermanyssus* and *Psoroptes* (causing mange in rabbits). They were exposed for stated periods on impregnated filter paper, but the experimental methods are not fully explained and the dose of material per unit area of paper is not ascertainable.

The results are tabulated, but are difficult to summarize. One observes the great resistance of *O. moubata* to many materials [as already recorded by Robinson, this *Bulletin*, 1944, v. 41, 972]: it is, however, relatively quickly killed by hexachlorcyclohexane and E 605 f (diethyl-p-nitrophenyl-monothiophosphate): the latter is remarkably effective against several other Acarina, but is dangerous to mammals. *P. A. Buxton*

LABORATORY PROCEDURES

Manwell, R. D. & Feigelson, P. **A Modified Method of preparing the J.S.B. Stain.** *J. Lab. & Clin. Med.* 1948, June, v. 33, No. 6, 777–82, 1 fig. [11 refs.]

A slight modification in the preparation of the polychrome methylene blue of J.S.B. stain is shown to be advantageous. The original method of autoclaving the solution and adding potash to the resultant fluid did not always give constant results. Instead, the mixture of 0·5 gm. of medicinal methylene blue, 0·5 gm. of potassium dichromate and 3 cc. of 1 per cent. sulphuric acid in 500 cc. of water, is heated for three hours in a boiling-water bath, and the precipitate is removed by filtration. It is dissolved in 500 cc. of M/20 disodium hydrogen phosphate and the solution is allowed to mature for 48 hours before use. It keeps well for months, but if required, the precipitate may be dried in a vacuum desiccator and dissolved when necessary in the phosphate solution (0·1 per cent. of stain).

It was discovered by spectrophotometric methods that the polychrome methylene blue consisted of a mixture of about 25 per cent. methylene blue and 75 per cent. azure blue. An artificial mixture of these was found to stain nearly as well as the natural product. [The authors use a very acid wash water (buffered at *p*H 6·2). A more alkaline water (about 7·2) is better if stippling of the red blood cell is to be demonstrated.] *P. C. C. Garnham*

REPORTS, SURVEYS AND MISCELLANEOUS PAPERS

Chronicle World Health Organization. 1948, July, v. 2, No. 7, 137–46. **The International Control of Cholera, Smallpox and Plague. A Note on the First Session of the Expert Committee on International Epidemic Control and the Three Joint OIHP-WHO Study Groups on the Pestilential Diseases.**

The Interim Commission of the World Health Organization set up an Expert Committee on International Epidemic Control " to examine the circumstances

underlying the spread of the major epidemic diseases and to restate the principles which should serve as a basis for their international control". The first session of this Committee in April was preceded by a meeting of three study groups of experts in Paris, set up jointly by WHO and the *Office International d'Hygiène Publique*: the groups made observations on recently established facts to be considered in the drafting of new international sanitary regulations.

The first group, which dealt with *cholera*, defined " medical examination " as including such laboratory examinations (*e.g.*, rectal swabbing) as are deemed necessary by health authorities. They recognized anti-cholera vaccination as of definite value but, in view of the relative character of the protection afforded, they felt that vaccinated persons should not be exempted from all control measures. They considered immunity to be manifest as early as the fourth day after injection, reaching its maximum on the eighth day and lasting at least six months. A single injection of 1 ml. of vaccine confers an appreciable immunity and constitutes a proper procedure for mass-vaccination campaigns. Two injections at a week's interval are preferable and should be given to those particularly exposed. There is no contraindication, as cholera vaccination gives little or no reaction ; it can be applied to all ages provided care is taken in the case of infants to reduce the dose in proportion to body weight. The group also discussed the antigenic potency of the mixed strains used at present and the transformation from " smooth " to " rough " forms during the course of the disease and convalescence. The WHO Expert Committee on Biological Standardization will consider these observations in arriving at a definition of a universally acceptable vaccine.

The second group discussed *smallpox*, under the headings of the pathogenic agent, modes of transmission and vaccination. They recommended new studies on egg media of the agents responsible for mild and malignant forms, which appear to be identical but have not yet been conclusively proved to be so. BURNET's work in Melbourne on the estimation of immunity was considered potentially valuable and should be repeated. On transmission, the group felt that all the possibilities had not been explored and recommended studies on the existence of the virus in bucco-pharyngeal droplets. They reaffirmed the fourteen-day quarantine period as laid down in the Conventions. Vaccination still remains the outstanding measure of defence. The group recognized the superiority of calf lymph and preferred Leake's multiple pressure technique. The danger of post-vaccinial encephalitis for a community is not to be compared to that of smallpox in the absence of vaccination. The best way to avoid this complication was to carry out primary vaccination well before school age. Babies should be vaccinated between the third and sixth months. In the case of an epidemic, all children, irrespective of age, should be vaccinated.

Of great importance are the definitions suggested for the reactions observed after re-vaccination. In addition to the successful and accelerated reactions, they define the so-called immunity reaction, for which they prefer the term " precocious non-vesicular " as " characterized by the appearance after the first day, of a vaccinal lesion which does not develop beyond the papulo-macular stage, is pruriginous and disappears at the latest on the third day." It is in reality the expression of an antigen-antibody reaction which does not necessarily imply that it is accompanied by immunity. They also recommended that all vaccination certificates which did not record a success or an accelerated reaction should be considered valid for six months only, while a doctor's statement confirming that he had observed a reaction of either kind should be valid for three years at least. (The Expert Committee considered that it was impossible to adopt this fundamental change of principle without further study, and deferred a decision.)

The group on *plague and other diseases*, recommended residual insecticides such as DDT as the chief measure of international protection against plague. The combined use of the new rodent poisons and insecticides should eradicate plague from ports, towns and villages but was not, of course, effective against sylvatic enzoötics. It was recognized that the incubation period, particularly in mild and vaccinated cases, might exceed the six days recognized by the conventions but the new insecticides and the curative action of sulphonamides and streptomycin diminish the chances of secondary contamination of ectoparasites and thus lessen the importance of the length of the incubation period. The incubation period of *typhus* was considered for practical purposes to be fourteen days rather than the Conventional twelve days. The use of residual insecticides is the essential measure for international protection, as in plague, but disinfection as well as disinsectization of the fomites was recommended in view of the danger of contamination by lice and flea excreta.

The Expert Committee on International Epidemic Control itself considered all these observations and, in addition, recommended (*a*) a delimitation of the endemic zones of pestilential diseases as a first step towards an attack on endemic foci—the best method of all ; (*b*) improvements in the present system of notifying urgent information, particularly by broadcasting ; (*c*) the inclusion of louse-borne relapsing fever among the pestilential diseases ; and (*d*) the inclusion of cerebrospinal meningitis, dengue fever, epidemic influenza and poliomyelitis among the diseases for which immediate notification of epidemics must be made.

[Apart from the elimination of endemic areas, the procedures for international protection against epidemics—still known collectively as " quarantine " though quarantine as such now plays but a minor rôle—fall into three stages. First, to collate and agree on the scientific measures required in the light of the most recent knowledge. Second, to translate these requirements into acceptable administrative measures. Third, to put such agreed administrative measures into force by international and national legislative action. The study groups referred to above represent the first of these processes ; the Committee on Epidemic Control represents the second, and the third will be the adoption in due course of international regulations by the World Health Assembly in place of the existing Conventions, and their implementation by States members of the World Health Organization.] *Neville M. Goodman*

Washington, Department of State. **Fourth International Congresses on Tropical Medicine and Malaria.** Abstracts. 1948, May 10–18, pp. iv + 148. Washington, D.C.

In the past there have been two distinct series of International Congresses of direct concern to tropical medicine ; that on Malaria, and that on Tropical Medicine. Both of these had their own permanent machinery which provided among other business for the calling of Congresses at regular intervals, but as a result of the war the machinery of both broke down and they were in danger of permanently lapsing. The President of the United States took the initiative of reassembling both on his own authority, as a joint meeting under the title of the Fourth International Congresses on Tropical Medicine and Malaria, held in Washington from 10th to 18th May 1948. In doing this, the United States Government has been of the greatest service to the science of tropical medicine, a service enlarged and underlined by the Honourable George G. C. Marshall, Secretary of State, in an opening address which stressed the concern of his Government to cooperate with others in the promotion of public health in the tropics.

About sixteen hundred persons took part, representative of all countries with interests in the tropics or subtropics, except the U.S.S.R. The machinery of the Congresses was re-established, and a proposal was agreed that the two Congresses should in future be amalgamated in one, though the programme arrangements should be adjusted under two Vice-Presidents in harmony with the predominant interest in malaria. The future of these Congresses is thus assured.

The volume under review is a series of abstracts of papers, mostly unsuited to further abstraction. Their general scope is indicated by the Section titles : Research and Teaching Institutes ; Tropical Climatology and Physiology ; Bacterial and Spirochaetal Diseases ; Virus and Rickettsial Diseases ; Malaria ; Helminthic Diseases ; Protozoan Diseases ; Nutritional Diseases in the Tropics ; Tropical Dermatology and Mycology ; Tropical Veterinary Medicine ; Public Health, and Medical and Veterinary Entomology.

Any attempt to assess the relative interest and value of some 170 papers must inevitably largely reflect the interests of the writer. However, the attendance at meetings of the section on malaria, incomparably larger than that at any other, showed where the interest of the majority lay. Without doubt the paper and demonstration by H. E. Shortt on the pre-erythrocytic cycle of *Plasmodium cynomolgi*, with the impromptu inclusion of that of *P. vivax*, were of an outstanding importance, recognized by the award to him of the Laveran Prize. The presentation of evidence on the qualities of new drugs, chloroquine, pentaquine, isopentaquine and paludrine, brought out particularly the efficacy of pentaquine in preventing relapses of *P. vivax* (the relapse rate of the intractable Southwest Pacific [Chesson] strain was reduced from 98 per cent. to 25 per cent. by a single therapeutic course in combination with quinine, and to 2 per cent. by two courses) ; the probable but as yet unverified superiority of isopentaquine; the toxicity of pentaquine which makes it unsuitable for indiscriminate use in full doses without close medical supervision ; and the position of paludrine and chloroquine as prophylactics. The general impression gained was that chemotherapeutic research has produced two almost perfect prophylactics or suppressants against *P. falciparum*, and the progress made indicates that the problem of relapsing *P. vivax* infections will eventually be overcome entirely.

Discussion on the control of malaria centred round two main objects ; attempts at total eradication of anopheline species and attempts at permanent but constantly recurring control short of eradication by the use of residual insecticides. F. L. Soper read an important and imaginative paper which brought together information on past schemes for the eradication of *Aëdes* and *Anopheles* and from this tried to forecast the possibilities of future work. Briefly, he considers that it is possible to eradicate any species of mosquito which is entirely domestic in its habits, but that the attack on forest-loving species is impossible on their own ground. This and other papers gave together a composite picture of widespread application of the two principles which was a revelation to the reviewer. The picture includes the extinction of *Aëdes aegypti* from a considerable proportion of the South American continent ; eradication or perfect control of anopheline vectors of malaria throughout the whole of Chile, Peru, Venezuela, British Guiana, Italy, Greece, Cyprus, and from large areas of Bombay Province ; the virtual though not yet absolute ending of malaria in the United States, and a number of schemes each more ambitious than would have been thought possible ten years ago. The assembly of knowledge on this subject, with opportunities for formal and informal discussion between those concerned, would alone have been adequate justification for the Congresses.

Another outstanding feature was the discussion on the use of chloromycetin against rickettsiae, and particularly the account of its use in the treatment of

scrub typhus in Malaya, which clearly showed that the typhus group of fevers can no longer be considered resistant to treatment. The sessions on helminthic diseases were notable for the discussions of the place of Hetrazan in the treatment of filariasis. Many American veterans have returned from the war with infections with *Wuchereria bancrofti* which are either symptomless or mainly productive of anxiety states, and this drug has shown marked success as measured by the disappearance of microfilariae from the blood ; it was, however, a matter of common comment that the resultant death of the parent worm often gave rise to a symptom complex which appeared to the patient to represent an exacerbation of the disease. There was much of interest in the Section concerned with Virus Diseases. This was not confined to tropical infections, concerning itself considerably with infectious hepatitis and transfusion jaundice, on which some valuable data of direct concern to the surgeon were presented ; but the discussions dealt at considerable length with tropical poliomyelitis, yellow fever, and other diseases. Poliomyelitis has only recently been recognized as a specific tropical problem, but the work presented at the Congresses should firmly establish its place as such. R. M. TAYLOR and Max THEILER gave an authoritative statement on the epidemiology of yellow fever which included all the recent work on jungle virus and its transmission, and Maurice PELTIER gave a useful account of the Dakar yellow fever vaccine which is administered by scarification and has now been given to over five million people ; the vaccine is approved by UNRRA and its successor WHO.

The many other subjects discussed ranged over very wide fields. The reviewer was specially interested in a paper on Population Problems in the Tropics by T. Lynn SMITH, in papers by G. GIRARD and K. F. MEYER on the place of live vaccines in the prophylaxis of plague, in one by S. S. SOKHEY and P. M. WAGLE on the treatment of plague, which showed that streptomycin is outstanding (3·3 per cent. mortality in all cases, 10·7 per cent. in cases which were septicaemic at the start of treatment) and sulphadiazine of great value (4·2 per cent. and 18·1 per cent. in comparable series) ; and in a paper by C. G. PANDIT on cholera vaccines. Other readers would, however, inevitably select other papers as of special concern, and no one could participate in the Congresses without feeling that almost all branches of tropical medicine were enriched both by papers and by formal and informal discussion.

The volume under review consists of about 170 authors' abstracts, of greatly varying length and detail, study of which gives little indication of the relative value of the papers. It was useful in arranging one's daily programme at the Congresses, and will be of use for record purposes. The reader interested in the substance of papers is advised to wait the publication of the Proceedings, which may not be long delayed. *G. Macdonald*

THOMSON, W. A. R. **African Medicine.** *Practitioner.* 1948, Sept., v. 161, No. 963, 205–10.

In this short paper, which records impressions made during a tour from Cairo to the Cape in the space of two months, the author makes a few pertinent observations, the first of which is that in Africa, men and money have never been available to allow of systematic surveys of disease such as are now considered essential in any well-run state. Hospital records are inevitably unreliable, and the true incidence of disease can only be assessed by survey work. [This observation, no doubt, is true, but surveys have been made in Africa, sometimes on a large scale, though more are needed.] The second is that little is known of the nutritional status and physiology of the " normal " African.

The author refers to overcrowding in hospitals and to the fact that in most medical laboratories there is so much routine work to be done that the opportunities for research hardly exist. He mentions malaria, sleeping sickness, schistosomiasis, amoebiasis, tuberculosis and leprosy as diseases of major importance, and ends by pointing out the valuable work done by members of the Colonial Medical Service. *Charles Wilcocks*

Leite, A. S., da Luz, J. V. B. & de Meira, M. T. V. Relatório da Missão Médica do Instituto de Medicina Tropical a Angola em 1945. [**Report of the Medical Mission of the Angola Institute of Tropical Medicine, 1945.**] *An. Inst. Med. Trop.* Lisbon. 1947, Dec., v. 4, 465–500, numerous figs. on 33 pls. (1 coloured) & 1 folding map.

The object of this mission was twofold: To verify the presence of dermatomycoses in the Luanda-Malanga region, between Benguela and the Belgian Congo, and, if possible, in the Zaire basin; secondly, to collect material for study and demonstration at the Institute. A sketch map indicates the route taken, by ship, aeroplane and automobile.

The authors found that superficial mycoses were common—pityriasis versicolor, tinea, epidermophytoses at times severe like tokelau (*Tinea imbricata*), favus, infections by *Trichophyton ferrugineum* (a very fine coloured plate depicts the growth of this on Sabouraud glucose) and other trichophyta, and sporotrichosis.

As regards the second objective, the usual collection was made of helminths, especially schistosomes and their vectors, larval and adult forms of diptera, blood specimens for trypanosomes, microfilariae and spirochaetes. Records are given of cases of leprosy, keloid, gangosa, yaws, late syphilis with mutilations, ulcers, onchocerciasis, etc. The whole account is well illustrated with photographs of the mission and its equipment, very realistic reproductions of favus and sporotrichosis, keloid and fungus affections of the feet.

H. Harold Scott

Heisch, R. B. **A Survey at Garsen.** *East African Med. J.* 1948, May, v. 25, No. 5, 220–24, 1 map.

Garsen is on the Tana River in Kenya, not far from the coast, and was a possible accessory site for the East African groundnuts scheme. A parasitological survey of the indigenous inhabitants was made in 1947. The malaria parasite rate in children was 53 per cent., in adults 9 per cent., the species being predominantly *P. falciparum*, though three infections with *P. malariae* were observed. Nomadic tribes (Galla) showed a high spleen rate (34 per cent.), a condition attributed to poor immunity. Night blood films were examined for microfilariae and 4 per cent. of the non-nomadic people were found to contain them. Faeces contained ancylostome ova (11 per cent.), *Ascaris* ova (15 per cent.) and *E. histolytica* (1·6 per cent.). *S. haematobium* was frequently seen in the urine (52 cases, but the total examined is not given.)

Anopheles gambiae appeared to be the vector of malaria; it occurred in large numbers after the long rains in May. *A. funestus* was rare. A tree hole survey revealed the presence of *Aëdes aegypti*, *Aëdes simpsoni* and *Aëdes metallicus*, and various species of the subgenus *Diceromyia*. The commonest and most voracious mosquitoes of the district were *Taeniorhynchus*, one of which (*T. africanus*) was found infected with a filaria.

Haemoproteus sp. was found in the blood of local pigeons.

[See also this *Bulletin*, 1948, v. 45, 671 for a survey of Taveta by the same author.] *P. C. C. Garnham*

DE MEIRA, M. T. V., NOGUEIRA, J. F. P. & SIMÕES, T. S. Relatório da Missão de Estudo do Instituto de Medicina Tropical a Cabo Verde em 1946–1947. [**Report of the Investigations of a Mission of the Institute of Tropical Medicine, Lisbon, to the Cape Verde Islands, 1946–47.**] *An. Inst. Med. Trop.* Lisbon. 1947, Dec., v. 4, 657–711, 41 figs. (4 maps).

The Institute of Tropical Medicine, Lisbon, sent out a team, with Dr. Manuel de Meira at the head, whose aim was " to carry out studies, clinical, entomological, etc., to acquire knowledge of the pathology of the colony and its chief endemic conditions." The same general lines of investigation were followed in the three islands of the archipelago, Sal, Boas Vista and S. Nicolau. The Mission stayed for 7 days in the first-named, 18 in the second and a month in the third. The examinations made and the numbers of persons examined in each of these were small and are not of general interest, but one or two points call for remark.

In the island of Sal there was an outbreak of yellow fever in 1873, infection being introduced from Brazil. Some 300 persons were attacked, with a fatality of 5.1 per cent. Whether it exists now cannot be stated with certainty ; if isolated cases do occur, they are mild and may pass unperceived among cases of malaria. The determining immunity test has not been carried out. In Boa Vista comparatively few examinations were made. Only 85 were examined for intestinal parasites ; 288 were examined clinically and among the only morbid conditions with double figures were diarrhoea, 74 [cause not stated] and chronic bronchitis, 18. Noteworthy is the fact that albinism, partial or total, occurred in ten members of a family of 20. In S. Nicolau the number examined was greater ; 1,673 specimens of blood were taken for examination later, 294 by day and by night for microfilariae, 10 only for malaria parasites ; 494 faecal examinations of 247 persons, by the Willis technique, showed *Ascaris* to be the most common infestation among those who had never been away from the island, and *Trichuris* the next ; hookworm was common in those coming to S. Nicolau from elsewhere, especially those recently arrived from S. Thomé. Nineteen cases of tinea were found, 6 due to *Microsporon felineum* ; *Trichophyton ferrugineum* was not found in S. Nicolau. Fungus infections of the feet, " mossy foot ", were " far from uncommon " [figures are not given, merely the statement *com relativa abundância*]. Information is given about the mosquitoes found. [See above p. 1122.]

H. Harold Scott

CLARKE, M. C. **The Binadins of North Borneo.** *Med. J. Malaya.* 1948, Mar., v. 2, No. 3, 179–83, 1 map.

The Binadins are sea-going Mohammedans who, during the past 80–100 years, have spread from the Philippines to some of the islands off North Borneo. They are independent, wild and carefree people, who do not work for wages and who do not trade anything but small quantities of fish ; they are very poor and live in primitive conditions. During the war they suffered considerably at the hands of the Japanese.

The author gives medical information which he collected on Sulug Island in May 1947. Malaria is common (spleen rate 55 per cent.), with anaemia ; only a few slides could be examined, they showed *Plasmodium vivax*. The chief vector in N. Borneo, *Anopheles leucosphyrus*, was found also in this island, breeding in the only two existing wells ; in one the water was brackish.

The diet of these people is poor ; fish is an important food, with tapioca and sago, but practically no vegetables and little fruit (apart from coconut) are eaten, and cassava is not much used. Signs of malnutrition are common—dental caries, bleeding gums, angular stomatitis, magenta tongue, roughness

of the skin, depigmentation of the skin. Apart from malaria there is not much actual disease, but the poor condition of these people is largely the result of malnutrition, which could be corrected by introducing vegetables and fruit trees, particularly bananas. *Charles Wilcocks*

MEYER, K. F. **The Animal Kingdom, a Reservoir of Human Disease.** *Ann. Intern. Med.* 1948, Aug., v. 29, No. 2, 326–46. [34 refs.]

PEARSE, A. S. [Edited by]. **Zoological Names. A List of Phyla, Classes, and Orders.** Prepared for Section F American Association for the Advancement of Science. 3rd Edition. 24 pp. 1948. Durham, North Carolina.

The second edition of this list [see this *Bulletin*, 1948, v. 45, 216] contained many errors, and was not made available to the general biological public. This third edition has been corrected. *Charles Wilcocks*

BOOK REVIEWS

MUIR, Ernest [C.M.G., C.I.E., M.D., F.R.C.S.(Edin.), etc.] **Manual of Leprosy.** pp. viii + 208, 70 figs. (10 coloured). 1948. Edinburgh : E. & S. Livingstone Ltd., 16 & 17 Teviot Place. [17*s.* 6*d.*]

This small practical book records the latest conclusions of the author based on his long experience in India and while on tours in Africa and other countries as medical secretary of the British Empire Leprosy Relief Association. It is on similar lines to his manual published some two decades ago in India, but is a new and up to date account written for the guidance of " doctors, nurses and lay workers." It deals mainly with a clinical description of the disease and its treatment and preventive measures now in common use, and makes no pretence to be a complete account of all aspects of the subject. For this reason the history, bacteriology, mode of infection, prevalence and rates of incidence are dismissed in the first seventeen pages, and are followed by short sections on tissue reaction and resistance and the lepromin test. The various recent systems of classification are briefly considered and that of the Pan-American Congress of 1946, based on histological findings, is adopted and summarized in a convenient table under lepromatous, uncharacteristic and tuberculoid types : although the difficulties of most workers in leprous areas in obtaining facilities and time for such histological examinations are recognized by the author.

The next few chapters are devoted to a careful clinical description of this protean disease, which is well illustrated by the author's photographs of cases and of histological changes, a few of which are in colour. This constitutes the most useful section of the book and it includes eye and other complications, bacteriological examinations, differential diagnosis, case taking and prognosis. Thirty pages are next devoted to treatment on the lines advocated by the author, who first recommends the use of injections of hydnocarpus oil and ethyl esters, although in recent years much of the oil supplies to Africa and elsewhere have arrived in a rancid condition unsuitable for this use. The active and convenient sodium hydnocarpate (in the form of alepol) is not mentioned, although its use in Calcutta thirty years ago first demonstrated the value of injections of active preparation of these oils. A chapter on sulphone treatment records the great advances obtained from their use in resistant advanced lepromatous cases by American workers and by the author himself in Trinidad. The recently used sulphetrone is considered to be the least toxic and most active of these preparations.

The last section deals with the method now in use in anti-leprosy control without going into the history of compulsory segregation, which is recommended for the infective cases. The importance of separation of healthy children of infected patients is emphasized. This book can be recommended for the use of workers in the numerous endemic areas of leprosy. *L. Rogers*

DE SOUZA-ARAUJO, Heraclides-Cesar [Chefe da Secção de Bacteriologia e do Laboratório de Leprologia do Instituto Oswaldo Cruz]. **História da Lepra no Brasil. Vol. II. Período Republicano (1889-1946). Album das organizações antileprosas.** [History of Leprosy in Brazil.] pp. xx and 380 pls. 1948. Rio de Janeiro : Imprensa Nacional.

This handsome volume depicts the organizations dealing with leprosy in Brazil during the period 1889–1946, the Republican Period. It is the second volume of Professor de Souza-Araujo's epochal work on Leprosy in Brazil and truly a monument of industry. The whole is to be completed in 3 volumes. The first was reviewed in this *Bulletin* last year, [1947, v. 44, 760]. This, the second volume, is an album of photographs with a minimum of letterpress. In addition to portraits of celebrities there are more than a thousand pictures on 380 plates. One cannot in words review a picture gallery ; one can only point out the objects aimed at and indicate their importance. True appreciation of their value can only be attained by personal study of them.

There are in Brazil 38 Leprosaria and another under construction in Bahia. Minas Gerais has six, São Paulo five, Pará three and several States have two. The number of patients interned at the end of 1946 totalled 20,638. There are 27 preventoria for children and one more in Acre Territory being constructed. Minas Gerais has four, São Paulo three, others have two or one each, with its Director and Leprologist, and 15 of them have a paediatrist also on the staff.

The volume contains portraits of scientists and administrators engaged in leprosy and its prevention and also photographs of various leprosaria, preventoria, plans and patients referring to the last decade of the nineteenth and the first 46 years of the twentieth centuries. In addition, there are group photographs of conferences, congresses and festivals. Each State and the various districts are taken in turn and there are collections of photographs of patients, children and institutions of the highest interest. The original idea was to interpolate these pictures and photographs in the text, dividing them into the three phases into which the " republican period " naturally falls : first, to 1920, or the period before modern prophylactic measures were in force ; second, the following decade or phase of Inspection for Prophylaxis by the D.N.S.P. (*Departamento Nacional de Saude Publica*), the National Department of Public Health ; third, the " Getulian Period ", that is the period of intensification of prophylaxis under the governorship of Dr. Getulio VARGAS, 1931–1945. It was, however, found impossible to carry out this plan of producing text and photographs together and the author has, therefore, brought out this volume of photographs separately ; the letterpress referring to them is to make the third volume which, says the author, is already in an advanced stage.

Professor de Souza-Araujo has taken the greatest pains to make the work complete. The reproductions are wonderfully clear and the whole constitutes a collection worthy of a place in any library and anyone possessing a copy is indeed to be accounted fortunate. Professor de Souza-Araujo is performing a work which will earn him the gratitude of all leprologists and those engaged in the study of the disease and its prevention.

Apart from the intrinsic value of the work itself, attention must be drawn to the very generous gesture on the part of the author who is handing over the proceeds of the sale of this volume, as he did in the case of the first, to

the International Leprosy Association—an act of philanthropy worthy of the highest honour and gratitude. *H. Harold Scott*

KEFFER, Luiza. **Indice Bibliográfico da lepra 1500–1943. Vol. I. A–H.** [Bibliographic Index of Leprosy.] pp. xxxviii+1–674. 1944.

——. **Indice Bibliográfico de lepra 1500–1944. Vol. II. I–P.** pp. xxi+675–1434. 1946.

——. **Indice Bibliográfico de lepra 1500–1945. Vol. III. Q–Z.** pp. xxiv+1435–1936. 1948. Biblioteca do Departamento de Profilaxia da Lepra do Estado de São Paulo—Brasil.

This monumental work in three volumes and covering over 1,900 pages has been edited by Luiza Keffer, Librarian of the Leprosy Prevention Department of the State of São Paulo, Brazil.

It is the fruit of ten years' constant labour in an institution which has collected " one of the greatest specialized bibliographies in medicine, which, at present, has more than 100,000 cards ".

Each work mentioned is to be found in the library of the Department : and although the Index is restricted to papers contained there, it is stated that it contains " practically everything that has been written about the legendary disease ". Indeed this claim would seem to be well-founded, for the references date from the year 1500 to the present day : they are arranged alphabetically and there is a comprehensive system of cross references, so that a given work appears under a number of headings.

The editor of the Index appeals again to medical workers and editors to send their special publications to the library, where they shall have the widest international publication : it is added that the library deals with no less than 185,000 consultations by correspondence annually. It is proposed to organize an Annual Supplement to the Index, which will be published as a special number of the *Revista Brasileira de Leprologia*.

The worker interested in leprosy and its history could ask for nothing fuller than this tremendous, carefully prepared and well-produced compilation.

H. J. O'D. Burke-Gaffney

CRAIG, Charles Franklin [M.D., M.A.(Hon.), D.Sc.(Hon.), F.A.C.S., F.A.C.P., etc.]. **Laboratory Diagnosis of Protozoan Diseases.** 2nd Edition. 384 pp., 56 figs. & 7 coloured pls. 1948. London : Henry Kimpton, 25 Bloomsbury Way, W.C.1. [27*s.* 6*d.*]

Colonel Craig is one of the leading authorities on tropical medicine in the United States. He retired some years ago from active teaching, but returned to fill gaps during the war and has continued to maintain his influence on parasitology in the United States by his contributions to the literature, especially to the literature on parasitological technique.

The first edition of this book was published during the recent war and was in great demand amongst medical men in the Forces whose previous experience of parasitology was often very limited. The author now feels that, with the many men returning from service who will have tropical infections, especially chronic amoebiasis and malaria, there should be a demand for another edition of his book.

Undoubtedly, Col. Craig's long suit is the intestinal protozoa and in particular the amoebae. He has made some outstanding contributions to this subject and it is not surprising that he has devoted over two-fifths of the book to amoebiasis and the flagellate infections of the bowel. The one hundred and

forty-five pages on the subject give much more than the student will require and constitute a valuable source of reference for the advanced worker, since for example he has given about 20 different media and methods of cultivation of *Entamoeba histolytica*. Three methods of his own are included. He naturally prefers his own methods but in summarizing this subject, he says that it is better to persevere with one type of medium and perfect one's own technique, rather than to try a succession of media. It is somewhat surprising that he has made little reference to the recent work of REES and his colleagues at the National Institute of Health, on the cultivation of amoebae with single strains of bacteria [this *Bulletin*, 1946, v. 436, 55 ; *ibid*, 1948, v. 45, 80], and the work on the addition of extracts of heat-, and otherwise, killed bacteria. Twenty-five pages are devoted to the complement-fixation tests (C.F.T.), a subject which is very much *sub judice* still, although the author has been working on it for at least two decades. He is almost the only worker who has had consistently successful results with his own methods. He finds the test positive in the case of the " symptomless " carrier, and whenever he has encountered a positive result he has usually been able to demonstrate *E. histolytica* cysts in the stools, after repeated examinations. It is not clear whether he followed up the negative cases quite as assiduously. He considers that the method of BOZICEVICH, HOYEM and WALSTON is less satisfactory since it usually gives negative results in the case of " carriers ". It would be interesting if this question of the C.F.T. in amoebiasis could be settled since its importance goes beyond that of a diagnostic aid. If in fact the C.F.T. is constantly positive in the case of " carriers ", it does indicate that there is some tissue invasion in all these cases (the author's view), but, if the test is frequently negative, it suggests that in many of these cases there is no tissue invasion (the reviewer's opinion).

The author gives a useful ' critique of diagnostic methods '. He considers that the second stool after saline purgation is more likely to contain active amoebae. In the search for cysts he considers that repeated examinations are necessary and recommends the zinc-sulphate centrifugal flotation method, with iodine or haemotoxylin for staining. He points out that by direct smear examinations less than 1 in 5 individuals will be identified at a single examination and that 10 will have to be negative before a reasonably certain negative report can be given, whereas by the flotation method one in three or four will be positive. He considers that sigmoidoscopy should not be employed as a routine, as only rarely will it help in diagnosis when the examination of the stools is negative. [This will come as rather a shock to his modern military school who use the sigmoidoscope as lightly as they use a spatula ; the real place of the sigmoidoscope is somewhere between these two extremes.]

Part II (50 pages) is on the laboratory diagnosis of the leishmaniases. The author gives a very complete and accurate account of this ; the main criticism offered is that he has given too many methods and even in his " critique of diagnostic methods " he has simply repeated what he has said before and has not faced the practical issue and given a lead to the reader by indicating when and where the various tests should be used. For example, he says " The serological tests employed in the diagnosis of kala-azar are all useful, but the most valuable are the complement fixation test, the aldehyde test of Napier, and the antimony tests of Chopra ". The C.F.T. can only be carried out in a well-equipped laboratory, whereas the aldehyde test can be done in any dispensary where there is a test tube and a bottle of formalin. The latter, however, has very definite limitations and is very little used in the first three months of the disease. Further, in hospital practice, the parasite should always be demonstrated by smear examination or by culture. These facts are not clearly explained. Again, it is stated that sternal puncture is safer than spleen puncture and as certain a diagnostic method. About the former, he states

" serious consequences have not been reported ", whereas in fact a number of deaths have been reported, and today few experienced workers will agree that it is as certain a diagnostic procedure, though it was fashionable to say so ten years ago. On the subject of peripheral blood cultures, he quotes Knowles as having reported only one positive culture in twelve cases of kala azar. The reviewer does not know where he encountered this statement, but it must have been in a paper written in Knowles's early days, since later he looked upon culture of the peripheral blood as a very reliable method, if the technique was right.

Part III (53 pages) is on the laboratory diagnosis of the trypanosomiases and Part IV (8 pages) on that of coccidiosis. Part V (90) is on the malarial plasmodia. This is an informative chapter ; it includes 6 coloured plates of which three are of the thick-film appearances of malaria parasites taken from Aimee WILCOX's useful manual. There are seven pages devoted to the flocculation tests in malaria which the author takes rather more seriously than do most workers in this field. The last few pages (Part VI—8 pages) are devoted to balantidiasis.

It is a book of limited scope which medical parasitologists will find very useful for reference. *L. E. Napier*

RICHARDSON, Ulick F. [B.Sc., M.R.C.V.S.]. **Veterinary Protozoology.** pp. viii+240, 1 coloured pl. & 34 figs. 1948. Edinburgh : Oliver and Boyd, Tweeddale Court & London : 98 Great Russell Street, W.C. [18/-].

This is the first textbook, so far as the reviewer is aware, to be published in this country dealing exclusively with veterinary protozoology. It consists of some 250 pages and is divided into twelve chapters, the first of which is an interesting general survey of the protozoa affecting man and domestic stock, and deals with the structure, classification, and reproduction of the parasitic protozoa as well as with their pathogenicity, the course of the diseases they produce, and the immunity or tolerance which sometimes follows such infections. Chapters II–X, which cover 155 pages, are devoted to a systematic description of the various species of pathogenic protozoa and their life-cycles, together with an account of the methods to be adopted for their control and for their eradication from the host. Chapter XI, consisting of 21 pages, is devoted to chemotherapy, although, as previously stated, the treatment of infections due to particular species of parasites is dealt with in the preceding chapters. The twelfth, and last, chapter is an excellent account of the techniques to be adopted for obtaining, examining, and preserving pathological material. At the end of each chapter there is a useful list of references, but many of these are of considerable antiquity. This quoting of work, once of fundamental importance, but now altered by the addition of more recent knowledge, occurs elsewhere in the text, and it is a little surprising to find such statements as (p. 74) " it has recently been found (Brumpt, 1937)," and (p. 127) " recently attempts have been made by Schilling (1936) ". The reviewer has noticed a few slips in spelling, as (p. 89) " Louri ", and (p. 66) " Maure's dots ".

The author in his preface states that " this book has been written in the hope that it may be of value to veterinary students, and to workers in the tropics, where protozoan diseases are the principal problems of the veterinary surgeon, and the chief obstacle to stock improvement. It is also hoped that it may stimulate interest and lead to research work, which will benefit both veterinary and human medicine ". The reviewer has no doubt that the book will stimulate interest in veterinary protozoology, to which human medicine already owes so great a debt, and it will prove helpful to workers in the tropics, but he has grave misgivings as to the wisdom of using it for the instruction of the inexperienced undergraduate or newly qualified practitioner. The reasons for

these misgivings arise from the fact that the author sometimes presents the reader, often without comment, with a series of views, one or more of which are at variance with the remainder; in addition, he sometimes expresses opinions unsupported by convincing evidence, which are at conflict with existing beliefs. The following may be cited as examples of contrasting statements quoted without comment: Having given an account of the life-cycle of *Theileria parva*, including its development in the intestine of the tick, the author, on the same page, quotes REICHENOW (1936) as saying "there is no development of *Th. parva* in the intestines of ticks." Methods for the control of *T. parva* (p. 56) occupy three pages, and the author, having described control by dipping, then gives two other methods: "All animals in the infected herd are examined daily, and any showing fever are slaughtered, the herd being moved to a clean area three times at intervals of sixteen days." Having mentioned reasons for this method, and recommended that the areas should not be restocked with cattle for eighteen months, he continues "a more drastic method which has met with more success is the slaughter of the whole infected herd, and the abandonment of the grazing grounds for cattle for eighteen months", while on the same page, under Immunization, he described the classical THEILER (1912) method as follows: "Losses were occasionally heavy, up to 30 to 40 per cent., but far less severe than if the disease had spread unchecked. The method does not appear to have been used with success elsewhere." Many similar examples, particularly as regards treatment, might be quoted from other chapters. To the worker with considerable knowledge of, or easy access to, modern literature, such divergent opinions are stimulating and interesting, but to the inexperienced student seeking immediate information, they are confusing and depressing.

The following may be given as examples of statements at variance with existing beliefs: when describing the life-cycle of the malaria parasite in man, the author writes (p. 62) "the sporozoite is a minute uninucleate organism which enters the blood stream and forces itself into a red-blood corpuscle, where it increases in size and becomes rounded off." Continuing with the malaria parasite, he states (p. 67) "not only are parasitised erythrocytes destroyed, but also enormous numbers of unparasitised cells, and it may be that the pigment also acts as a haemolysin," and on the same page, "it has been stated that a mononucleosis of 15 per cent. or more is diagnostic of malaria." His views regarding the transmission of leishmaniasis are similarly unorthodox—"the leishmania of the dog may be transmitted by species of Phlebotomus, notably *Ph. sergenti* and *Ph. papatasii*, and by the tick *Rhipicephalus sanguineus* and also probably by fleas." (p. 95).

The existence of a filter-passing stage of trypanosomes is discussed at some length, and the author would appear to believe that such a stage exists (p. 103); this is not the generally accepted view, while the reviewer knows of no good evidence to support the statement on page 101—"it is thought that the state of development of the trypanosome at the time of feeding may influence the infection rate, and that, for instance, no infection with *T. brucei* might occur if no stumpy forms were present in the blood." Two errors in chemotherapy which might be mentioned are: (p. 201) "Pentamidine has not proved satisfactory in any infections . . ." and on page 128, "In human sleeping sickness the drugs which have stood the test of large scale treatment are antrypol (germanin) and tryparsamide, ..." It is generally agreed that pentamidine has become well established for the treatment and prophylaxis of *T. gambiense* in man, while although tryparsamide has stood the test of time against *T. gambiense*, it has not done so against *T. rhodesiense*.

The book is well got up and well illustrated, the drawings, with the exception of a frontispiece in colour, being for the main part in diagramatic form.

Mr. Richardson's book, which is published at the reasonable price of 18s., should have a considerable sale among veterinary practitioners, as it contains much valuable information which was previously only obtainable by searching through numerous more general textbooks. *R. M. Gordon*

BENBROOK, Edward, A. [V. M. D., Professor and Head of the Department of Veterinary Pathology, Iowa State College] & SLOSS, Margaret W. [B.S., D.V.M., M.S.]. **Veterinary Clinical Parasitology.** 187 pp., 247 figs. 1948. Ames, Iowa: The Iowa State College Press. [$4·50.]

The purpose of this book, as stated in the authors' preface, is "to assist in the diagnosis of parasitism and of parasitic disease by means of laboratory techniques, and to show by illustrations the more commonly encountered forms as well as some of those less often seen."

It is concerned primarily with veterinary parasitology and only three of the more important groups of parasites, namely intestinal parasites, parasitic mites and ticks are considered in the present volume: it is stated that if there is a demand for additional chapters, they may be added when sufficient material becomes available; and, to this end, the book is bound in loose-leaf form, so that pages may be added or moved.

The book covers 187 pages of art paper and some 120 of these are occupied with excellent photographs of specific parasites and illustrations of technical methods. The former are clearly marked on each page showing the animal host to which the parasite refers, and this covers a wide range. Seven pages of photographs are given to intestinal parasites of man. Nine pages show illustrations of pseudoparasites or spurious parasites, a most useful guide to microscopists.

The text deals with technical methods in the greatest detail and illustrates the stages of them with very clear photographs. In the second chapter (dealing with mites) and in the third (lice) lists of species and their hosts are also given. The descriptions of methods of stool examination include the smallest details.

There are no less than 20 pages of references, dealing separately with each of the three chapters, and a most comprehensive index of 10 pages.

The work is beautifully presented and produced and contains much that the medical parasitologist will find of practical value: it is indeed an excellent book to have on the bench in any parasitological laboratory which deals with the relevant subjects. *H. J. O'D. Burke-Gaffney*

NAUCK, E. G., with ENIGK, K., VOGEL, J., REICHENOW, E., WESTPHAL, A. & WEYER, F. **Tropical Medicine and Parasitology.** Fiat Review of German Science, 1939-1946. 253 pp., 8 figs. 1948. Published by Office of Military Government for Germany, Field Information Agencies Technical, British, France, U.S.

The term FIAT is an abbreviation for Field information Agency, Technical, and the present volume forms one of a series which, in addition to medicine, deals with physics, chemistry, mathematics and sciences of the earth.

Well then might it be termed a "Review of Reviews" serving to inform the world of research work on Tropical, Medicine, Hygiene and Parasitology during the war years—from May 1939 to May 1946. This has been accomplished by the co-operation of many German contributors, who have furnished the contents while the whole has been prepared for publication by the scientific branches of FIAT. Thus the section on general Tropical Hygiene is by E. G. NAUCK, on Parasitology by E. Reichenow and F. WEYER. Tropical Diseases

of Man are dealt with by NAUCK, REICHENOW, VOGEL, WESTPHAL and WEYER: those of domestic animals by K. ENIGK. So condensed is the material that it becomes difficult to convey an idea of the amount of information that this publication contains. Those who look for a detailed account of important investigations do so in vain, but every page gives the impression of endless striving for knowledge against adversity. The opening pages are indeed a syllabus of the more important German books on tropical medicine and hygiene as well as of the journals devoted to this subject. The best known of these—"*Archiv für Schiffs- und Tropenhygiene*" was, on completion of the 45th volume in 1941, renamed "*Deutsche Tropenmedizinische Zeitschrift*", but, on account of war restrictions, it too in June 1944 came to an end and with it the old spirit of enquiry appears to have been, temporarily, extinguished. A considerable space is devoted to the subject of acclimatization in the tropics, to the question of housing and nutrition. The parasitological section, mostly by Reichenow, affords a detailed review of protozoology in these war years, most of which has found its way into the pages of this *Bulletin*, and of course includes the original studies of KIKUTH, REICHENOW and MUDROW on the exoerythrocytic cycle of *P. praecox* and *P. cathemerium*. Other chapters again summarize work done, mainly on therapy, upon malaria, blackwater fever, leishmaniasis, trypanosomiasis, amoebiasis, spirochaetoses and bacterial diseases, including leprosy and plague. The virus and rickettsial diseases and tropical worm infections also receive attention and there is a contribution on nutritional disorders. The volume is well documented and should continue to serve as a record of hard-won achievement for many years to come.

P. Manson-Bahr

LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE

The Langley Memorial Prize, which is open to competition among officers, past and present, of the West African medical departments, has been awarded to Dr. D. G. Fitzgerald Moore for his essay on Nutritional Eye Disease and Effects of Nutritional Retrobulbar Neuritis.

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Bodman, R. I. & Stewart, I. S., 433 (R.F.)
Boeck, C. W., with Danielssen, 829 (B.R.)
Boghani, B. P., with Parekh, 36, 862 (Mal.)
Bohnel, E., with van der Scheer & Cox, 60 (Typh.)

Boiron, H. & Koerber, R., 93 (Hel.)
——, —— & Carronnier, B., 603 (R.F.)
Bolanos, L., with Peña Chavarría, Sáenz Herrera & Cordero, 790 (R.F.)
Bolliger, A. & Backhouse, T. C., 883 (Leish.)
Bonatti, A. A., with Olmos Castro & Arcuri, 1010 (Lep.)
Bonne, C., 30 (Mal.)
——, Bras, G. & Verhaart, W. J. C., (1108) (Der.)
von Bonsdorff, B, 97, 198, 260, 920 (Hel.)
Boquet, P., 1027 (Vms.)
Borrow, A., Fowden, L., Stedman, M. M., Waterlow, J. C. & Webb, R. A., 729 (Def. Dis.)
Boscardi, F., 92 (Hel.)
Boshes, B., 396 (Mal.)
Bosselut, H., 775 (Leish.)
Bostick, W., Johnstone, H. G., & Anderson, H. H., (338) (Am.)
Bostick, W. L., with Miller, Keddie & Johnstone, 466 (Der.)
Bosworth, M. R., with Singher & Millman, 682 (Mal.)
Botez, V., with Dumitresco, Constantinesco & Sturdza, 1076 (Typh.)
Boturão, Edg. & Boturão, Edm., 640 (Haem.)
Boturão, Edm., with Boturão, 640 (Haem.)
Boulter, E. A., with Findlay & MacGibbon, 206 (Haem.)
Bourgain, M. & Bazil, A., 1031 (Der.)
Bourne, G. C., with Niles, 782 (Typh.)
Bovet, D., Decourt, P., Schneider, J. & Montezin, G., (873) (Mal.)
Bower, A. G., with Rosove & West, 892 (Typh.)
Bowers, R. F., with Burchenall & Haedicke, 319 (Leish.)
Box, L. A., 713 (Lep.)
Boyd, M. F., 138, 395 (Mal.)
—— & Kitchen, S. F., 393 (Mal.)
——, with Putnam & Mead, 488 (Mal.)
Boyer, J., 57 (Typh.)
Boyer, R., with Barry, 1123 (Ent.)
Bozicevich, J. & Hoyem, H. M., 916 (Hel.)
——, with Terry, 1084 (Am.)
Bracken, M. M., Bailey, W. R., Jr. & Thomas, H. M., Jr., 1098 (Hel.)
Brackett, S. & Bliznick, A., 80 (Am.)
——, with Kenney, 240 (Mal.)
Brackett, S., with McMullen, 920 (Hel.)
Bradford, B., with Whitnall, 274 (Ent.)
Bradley, G. H. & Fritz, R. F., 42 (Mal.)
Brady, F. J., with Jones, 916, 918 (Hel.)
——, with Ness, Cowie & Lawton, 447 (Hel.)
Braga, E., Penido, H. M., Bassères, M. S., Pinto, D. B., Bezerra, F. P., Jr. & Moura, F. P., 408 (Mal.)
Braga, R. V., 1007 (Lep.)
Brain, W. R., 203 (Def. Dis.)
von Brand, T. & Files, V. S., 526 (Hel.)
Brandenburg, R. O., with Spies, Garcia Lopez, Stone, Milanes & Aramburu, 460 (Sp.)
Bras, G., 180 (Am.)
——, with Bonne & Verhaart, (1108) (Der.)
Braudo, J. L., with Rudolph, (179) (Am.)
Braun, K., with Rachmilewitz & de Vries, 984 (Leish.)
Brauwere, P., 816 (Reports, etc.)
Brea, C. A. & Canale, E. C., (367) (Misc. Dis.)
Brennan, J. M., 121, 652, 654 (Ent.)
Brescia, F. & Wilson, I. B., 155 (Mal.)
Briceño Rossi, A. L., (368) (Misc. Dis.)
Bricker, A. G., with MacCreary, 210 (Misc. Dis.)
Brisou, J. & Autheman, R., 987 (Typh.)
British Guiana, 976 (Mal.), 1041 (Reports, etc.)
British Med. J., 105 (Sp.), 124 (Reports, etc.), 601 (Chl.), 983 (Tryp.)
Brockman, D. D., 645 (Der.)
Brooke, M. M. & Donaldson, A. W., 1056 (Mal.)
Brosius, O. T., Thomas, E. E. & Brosius, B., 1023 (Hel.)
Brown, B. R. & Hammick, D. L., (491) (Mal.)
Brown, R. B., with Hays & Godfrey, 519 (Am.)
Brown, E. H., 907 (Am.)
Brown, H. E., with Streeten, Cohen, Gutteridge, Wilmer, Smith & Derrick, 891 (Typh.)
Brown, H. W., with Otto & Maren, 353 (Hel.)
Brownlee, G., 711 (Lep.)
Brncic, D., with Neghme, Faiguenbaum, Pizzi, Roman, Donoso, Hoecker, Agosin, Christen, Sotomayor, Silva & Vilches, 356 (Hel.)
Brug, S. L. & Vos, J. J. T., 368 (Prot.)
Brumpt, E. & Chabaud, A. G., 1122 (Ent.)
Brumpt, L. C., (1073) (Tryp.)
—— & Gujar, B. J., (1100) (Hel.)
Bruneau, J., with Blanc, Poitrot & Delage, 892 (Typh.)
Brunt, D., 648 (Heat Str.)
Brusco, C. M., with Fiol, Jonquieres, Melamed & Firpo, 1011 (Lep.)
de Bruyne, J. I., with van Creveld & Arons, 1121 (Prot.)
Brygoo, E., with Courdurier, 107 (Haem.)
Buchanan, J. C. R., 1040 (Reports, etc.)
Buchheit, J. R., with Kuntz & Stirewalt, 621 (Hel.)
Buck, M., 503 (Tryp.)
Buckner, A. J., with Fay & Cole, 372 (Ent.)
Budden, F. H., with Montgomery, 322, 324 (Typh.)
Bull. Inst. Hyg. Maroc, 229 (Mal.), 549 (Reports, etc.)
Bull. Méd. de l'Afrique Occidentale Française, 471 (Reports, etc.)
Bull. U.S. Army Med. Dept., 37 *bis* (Mal.)
Bull. World Health Organization, 389 (Mal.)
Bulsara, S. N., (350) (Hel.)
Bunnell, I. L., with Furcolow & Tenenberg, 644 (Der.)
Bunting, H., with Harrison, Ordway & Albrink, 498 (Bl.)
Buonomini, G. & Mariani, M., 673 (Mal.)
——, G. & Motta-Diana, A., 399 (Mal.)
Burchenal, J. H., Bowers, R. F. & Haedicke, T. A., 319 (Leish.)
Burckhalter, J. H., Tendick, F. H., Jones, E. M., Jones, P. A., Holcomb, W. F. & Rawlins, A. L., (682) (Mal.)
Burette, J., (361) (Vms.)
Burgess, R. W., with Coatney, Cooper, Ruhe, Josephson & Young, 680 (Mal.)
——, with ——, —— & Young, 150 (Mal.)
——, with ——, ——, —— & Smarr, 150 (Mal.)
——, with Eyles & Young, 1052 (Mal.)
——, with Miller & Carpenter, 485 (Mal.)

——, with ——, 1053 (Mal.)
——, with ——, Hardman, Frohne & Sabrosky, 674 (Mal.)
Burgio, G. R., 507 (Leish.)
Burkitt, D. P., (932) (Misc. Dis.)
Burroughs, A. L., 254 (Pl.)
Burrows, W., Elliott, M. E. & Havens, I., 335 (Chl.)
—— & Havens, I., 898 (Chl.)
——, Mather, A. N., Elliott, M. E. & Havens, I., 178 (Chl.)
Burwell, E. L., Kinney, T. D. & Finch, C. A., 311 (Bl.)
Bush, D. L., with Thompson, McGinty & Wilson, 1066 (Mal.)
Bushland, R. C., 372 (Ent.)
——, with Knipling, Babers, Culpepper, & Raun, 815 (Ent.)
Bustamante, M. E. & Varela, G., 165, 252 (Typh.)
Busvine, J. R., with Hadjinikolau, 936 (Ent.)
Butts, D. C. A., 352 (Hel.)
Buxton, P. A., 502, 983 (Tryp.)
Bylmer, J. & Winckel, C. W. F., 487 (Mal.)

C.

Cabannes, with Sarrouy & Prost, (858) (Mal.)
Cabassu, H., with Ranque, Ranque & Cabassu, 883 (Leish.)
Cabassu, J., with Ranque, Ranque & Cabassu, 883 (Leish.)
Cafiso, J. R., with Anderson, Hansen & Sah, 520 (Am.)
de Caires, P. F., 253, 511 (Y.F.)
Caldwell, A. G. & Walls, L. P., (588) (Tryp.)
Caldwell, F. E. & György, P., 417 (Tryp.)
Calero, C., 269, 813 (Der.), 702 (Typh.)
Caley, F. E. de W., 301 (Mal.)
Callison, M. K., with Anderson, Johnstone, Packer, Young, Hambly, Anderson & Reed, 903 (Am.)
Callot, J., 1036 (Ent.)
—— & Vendrely, R., 990 (Typh.)
Calvó Fonseca, R., 257, 785 (Am.)
Camain, R., 322 (Typh.)
——, with Floch, 250 (Typh.), (442), (610) (Lep.), (506), (1073) (Tryp.)
Cambournac, F. J. C., (1043) (Reports, etc.)
——, with de Azevedo & Pinto, 966 (Mal.), 1081 (Y.F.)
Campau, E. J., with Kartman, Newcomb & Morrison, (571) (Mal.)
Campbell, T. C. & Defries, R. D., 477 (Rab.)
Campourcy, A., (111) (Der.)
Canale, E. C., with Brea, (367) (Misc. Dis.)
Canaperia, G. A., 229 (Mal.)
Cappeletti, R., (370) (Ent.)
de Caprio, P., 753 (Mal.)
Carbonell, L., with Benaim Pinto, Gil, & Gomez (206) (Haem.)
Carboni, E., with Fernández & Tomassino, 1012 (Lep.)
Cardoso, R. A. de A., with Torres, Muniz & Duarte, 776 (Leish.)
Carlson, W. W. & Cretcher, L. H., (576) (Mal.)
Carnevale, A., 419, 507 (Leish.)
Carothers, J. C., 125 (Reports, etc.)
Carpenter K. J., with Kodicek & Harris, 104 (Def. Dis.)
Carpenter, S. J., with Miller & Burgess, 485 (Mal.)
Carroll, D. & Hunninen, A. V., 624 (Hel.)
Carronnier, B., with Boiron & Koerber, 603 (R.F.)
Cartwright, G. E., Chung, H. L. & Chang, A., 693 (Leish.)
Casis Sacre, G., 1119 (Misc. Dis.)
Cassinelli, J. F., with Lasnier & Ardao, (98) (Hel.)
Castana, V. & Milani-Comparetti, P., 755 (Mal.)
Castañé Decoud, A., with Schujman, 1011 (Lep.)
Castellani, A., 1116 (Ulc.)
Castelnuovo, G., with Seager, 164 (Leish.)
Castillo, R., 750 (Mal.)
de Castro, A., with Barreto, 171 (Pl.)
Castro, E. L., with Filho, 1088 (Am.)
de Castro, F. T., with de Freitas, 1073 (Tryp.)
Castro Casal, E., with Yanniceli & Suarez, (98) (Hel.)
de Castro Palomino, J. & Alfonso y Armenteros, J., (363) (Der.)
Catrysse, R. M., 1115 (Ulc.)
Caubet, P., with Montestruc, (189), 345 (Lep.)
——, with —— & Ragusin, 259 (Hel.)
Cauchi, J., 784 (Pl.)
Caughey, J. E. & Dudgeon, J. A., 168 (Typh.)
Causey, C. E., with Causey & Costa, (443) (Hel.)
Causey, O. R., Costa, O. & Causey, C. E., (443) (Hel.)
—— & Kumm, H. W., 1080 (Y.F.)
——, Laemmert, H. W., Jr. & Hayes, G. S., 992 (Y.F.)
Ceccaldi, J. & Trinquier, E., 927 (Vms.)
——, with ——, 928 (Vms.)
——, ——, Pochard, P. & Vargues, R., 771 (Tryp.)
——, with Vaucel, 503 (Tryp.)
Celener, D. & Orlandi, M. A. R., (98) (Hel.)
Chabaud, A. G. 994 (Pl.)
——, with Brumpt, 1122 (Ent.)
Chaboud, G., with Launoy, 879 (Tryp.)
Chadwick, L. E., with Horton & Karel, 593 (Typh.)
Chakravarti, H., with Chaudhuri, (258) (Am.) 729 (Def. Dis.)
Chakravarty, N. K., with Sen Gupta & Mallik, 882 (Leish.)
Chalgren, W. S. & Baker, A. B., 1034 (Misc. Dis.)
Chalmers, T. C., with Earle, Berliner, Taggart, Welch, Zubrod, Wise, Greif & Shannon, 957 (Mal.)
Chambost, L. & Houdemer, E., (274) (Ent.)
Chand, A. & Gupta, D. C., (368) (Misc. Dis.)
Chandra Sekar C., 337 (Chl.)
Chandy, P. J., 713 (Lep.)
Chang, A., with Cartwright & Chung, 693 (Leish.)
Chang, F. L., with Liu & Lin, 325 (Typh.)
Chang, H.-C., with Liu & Wang, 1079 (Typh.)
Chang, N. C. & Hou, T. C., 882 (Leish.)
Chapman, B. M., Schwartz, H. & Haislip, D. B., 788 (Am.)

Chapman, C. W., with Hoppe, 505 (Tryp.)
Chardome, M., with Peel, 809 (Hel.)
Charters, A. D. & Manson-Bahr, P. E. C., 546 (Misc. Dis.)
Chassain, J., with Saleun, 875, 878 (Tryp.)
Chatterjee, K. R., with Dharmendra, 793 (Lep.)
Chaudhuri, R. N. & Chakravarti, H., (258) (Am.), 729 (Def. Dis.)
—— & Rai Chaudhuri, M. N., 35 (Mal.)
Chaussinand, R., 187 *bis*, 188, 607, 1008, (1008), 1009, 1012 (Lep.)
Chelăresco, M., with Ballif & Constaninesco, 524 (R.F.)
——, with Ciuca & Baliff, 481 (Mal.)
—— & Curpan, C., 136 (Mal.)
Chen, G., 397 (Mal.), 691, 773 (Tryp.)
—— & Geiling, E. M. K., 490 (Mal.) 691 (Tryp.)
—— & McCreary, J. H., 505 (Tryp.)
Chen, J. H. & Wu, Y. K., 143 (Mal.)
Chen, K. C., 1022 (Hel.)
Chen, K. K. & Anderson, R. C., 491 (Mal.)
Chen Tzu-Ta, 731 (Def. Dis.)
Chenoweth, B. M., Jr., with Franks & Stoll, 453 (Hel.)
Chesterman, C. C., 502 (Tryp.), 711 (Lep.)
Chevallier, A., with Sandor, Girard & Skrobisz, 994 (Pl.)
Chevé, J., Courdurier, J. & Saissac, R., 249 (Typh.)
Chevrier, A. M., with Lamy, 904 (Am.)
——, with —— & ——, 1006 (Am.)
Chhatre, K. D., with Simeons, 39 (Mal.), 332 (Pl.)
Chiang, H.-S., with Khoo, 625 (Hel.)
Chin, T. H., with Tiner, (921) (Hel.)
Chinn, M., 31 (Mal.)
Chodzko, W., 113 (Misc. Dis.)
Choquette, L. P. E., with Miller, 1083 (Am.)
Chorine, V. & Colas-Belcour, J., 342 (R.F.)
—— & Crougue, O., (1014) (Lep.)
Chorley, T. W., 771 (Tryp.)
Chou, T. Q., Fu, R. Y. & Kao, Y. S., 755 (Mal.)
Christen, R., with Neghme, Faiguenbaum, Pizzi, Roman, Donoso, Hoecker, Brncic, Agosin, Sotomayor, Silva & Vilches, 356 (Hel.)
Christensen, P. A., 361 (Vms.)
——, with Grasset, 268 (Vms.)
—— & de Waal, M., 108 (Vms.)
Christophers, S. R., 40 (Mal.)
Chronicle World Health Organization, 174, 333 (Chl.), 1124 (Reports, etc.)
Chu, L. W., with Huang, Huang & Huang, 996 (Pl.)
Chung, H. L., with Cartwright & Chang, 693 (Leish.)
Churchill, H. M., with Nolan & Mann, 919 (Hel.)
Chwatt, L. J., 577 (Mal.)
Ciaccio, G., with Giroud, 60, 885 (Typh.)
Cicconardi, A. & Alfano, A., 678 (Mal.)
Ciuca, M., Baliff, L. & Chelaresco, M., 481 (Mal.)
Clampit, J. M., 708 (Am.)
Clapham, P. A., (199), (351) (Hel.)
Clark, M., 815 (Misc. Dis.)
Clark, M. C., with Harned, Cunningham, Halliday, Vessey, Yuda, Hine, Cosgrove & SubbaRow, 628 (Hel.)
Clarke, D. H. & Fox, J. P., 986 (Typh.)
—— & Theiler, M., 686 (Mal.)
Clarke, M. C., 1130 (Reports, etc.)
Claude, R., with Lebon, Maire & Duboucher, (83) (Am.)
Clavero, G., Romeo Viamonte, J. M. & Lozano, A., 238 (Mal.)
Cleland, R. R., with Davis, 356 (Hel.)
Cliffe, W. H., Curd, F. H. S., Rose, F. L. & Scott, M., (866) (Mal.)
Cloetens, W, with Houssiau, (788) (Am.)
Coatney, G. R., with Cooper, 147 (Mal.)
——, Cooper, W. C. & Ruhe, D. S., 679 (Mal.)
——, with —— & Ruhe, 140 (Mal.)
——, ——, ——, Josephson, E. S., Young, M. D. & Burgess, R. W., 680 (Mal.)
——, ——, Young, M. D. & Burgess, R. W., 150 (Mal.)
——, ——, ——, Burgess, R. W. & Smarr, R. G., 150 (Mal.)
——, ——, —— & McLendon, S. B., 150 (Mal.)
Cochrane, E., with Newbold, 307 (Mal.)
Cochrane, R. G., 791 (Lep.)
Coghill, N. F. & Gambles, R. M., 709 (R.F.)
Cohen, R. S., with Streeten, Gutteridge, Wilmer, Brown, Smith & Derrick, 891 (Typh.)
Cohn, R., with Bianco, Saunders & Levine, 28 (Mal.)
Coito, A. de M., 1019 (Hel.)
Coito, A. de M. F., with de Azevedo & Teixeira, 985 (Leish.)
Colah, R. B. M., with Wagle, 256 (Pl.)
Colas-Belcour, J. & Abonnenc, E., (815) (Ent.)
——, with Chorine, 342 (R.F.)
—— & Millot, J., (1122) (Ent.)
Coldefy, with Basset & de Kouroch, (465) (Der.)
Cole, E. L., with Fay & Buckner, 372 (Ent.)
——, with —— & Simmons, 1037 (Ent.)
Cole, L. C. & Koepke, J. A., 421 (Typh.)
Collard, P. J. & Hargreaves, W. H., 320 (Leish.)
Collier, W. A., 909 (R.F.)
Collignon, E., 748 (Mal.)
Collins, D. L., (243) (Mal.)
Collins, L. H., Jr., with Rawson & Grant, 929 (Der.)
Colonial Office, (655) (Reports, etc.), 1109 (Oph.)
Combiesco, D., 1076, 1080 (Typh.)
——, Vasiliu, V. & Dumitresco, N., 169 (Typh.)
Comfort, M. W., with Weir, 205 (Sp.)
Commonwealth of Australia, (1043) (Reports, etc.)
Conan, N. J., Jr., 430 (Am.)
——, with Berliner, Earle, Taggart, Zubrod, Welch, Bauman, Scudder & Shannon, 960 (Mal.)
Congo Belge, 124, 549, 816 (Reports, etc.)
Consolazio, W. V., Pecora, L. J. & Tusing, T., 112 (Heat Str.)
Constant, Y. & Gouère, P., 928 (Vms.)
Constantinesco, N., with Ballif & Chelăresco, 524 (R.F.)
——, with Balteanu, 1078 (Typh.)
Constantinesco, S., with Dumitresco, Botez & Sturdza, 1076 (Typh.)

Constantinescu, G. & Ionescu, R., 710 (R.F.)
Contreras, F. & Jaqueti, G., 1008 (Lep.)
Contreras Duenas, F., (436) (Lep.)
Convers, F., 257 (Am.)
Cooke, W. E., 76 (Am.), 711 (Lep.)
Cooke, W. T., Frazer, A. C., Peeney, A. L. P., Sammons, H. G. & Thompson, M.D., 535 (Sp.)
Coombes, A. E. R., with Wright, 428 (Am.)
Coonoor, 657 (Reports, etc.)
Cooper, G. R., with Dillon, 710 (Ys.)
Cooper, W. C. & Coatney, G. R., 147 (Mal.)
——, —— & Ruhe, D. S., 140 (Mal.)
——, with —— & ——, 679 (Mal.)
——, with ——, ——, Josephson, Young & Burgess, 680 (Mal.)
——, with ——, Young & Burgess, 150 (Mal.)
——, with ——, ——, —— & Smarr, 150 (Mal.)
——, with ——, —— & McLendon, 150 (Mal.)
Cordero, E., with Peña Chavarría, Sáenz Herrera & Bolanos, 790 (R.F.)
Cornatzer, W. E., with Andrews, 396 (Mal.)
Corradetti, A., (750), (761), 871 (Mal.)
Cosgrove, R., with Harned, Cunningham, Halliday, Vessey, Yuda, Clark, Hine & SubbaRow, 628 (Hel.)
Costa, N., with Magalhães Carvalho, Pinto, Schmidt & Potsch, 635 (Def. Dis.)
——, with da Silva, 194 (Hel.)
Costa, O., with Causey & Causey, (443) (Hel.)
——, with Lacaz, Ashcar & Viotti, 1107 (Der.)
da Costa, O. R., (443) (Hel.)
Costa, R. S., 1087 (Am.)
Cotrufo, P. & Zito, P., 591 (Typh.)
Cotter, E., 655 (Reports, etc.), 757 (Mal.)
Coudert, J., with Revol & Morel, 590 (Typh.)
Coulston, F., with Huff, 762 (Mal.)
——, with Whorton, Kirschbaum, Pullman, Jones, Craige, Alving & Eichelberger, 139 (Mal.)
Courdurier, J. & Brygoo, E., 107 (Haem.)
——, with Chevé & Saissac, 249 (Typh.)
Coulston, F., with Whorton, Pullman, Kirschbaum, Jones, Alving, Craige & Eichelberger, 235 (Mal.)
Courtois, C. M., with Tonking & Lavoipierre, 241 (Mal.)
Courvès, J. M., (1057) (Mal.)
Coutinho, A., 931 (Misc. Dis.)
Coutinho, J. de O., (857), (969) (Mal.)
Cova-Garcia, P., with Gabaldon, (138), (573) (Mal.)
Covell, G., (401), 757 (Mal.)
Covell, G., with Shortt, Garnham & Shute, 482 (Mal.)
Cowan, G. A. B., 463 (Haem.)
Cowie, D. B., with Ness, Brady & Lawton, 447 (Hel.)
——, with Smith, Steele & Eakin, 985 (Leish.)
Cowper, S. G., 444 (Hel.)
Cox, A. I. & Achuton, (520) (Am.)
Cox, H. R., with Koprowski, 331 *bis* (Den.)
——, with van der Scheer & Bohnel, 60 (Typh.)
Coxon, R. V., with Latner & King, 96 (Hel.)
Craig, C. F., 1133 (B.R.)
Craige, B., Jr., with Alving, Eichelberger, Jones, Whorton & Pullman, 956 (Mal.)
——, ——, Jones, R., Jr., Whorton, C. M., Pullman, T. N. & Eichelberger, L., 139 (Mal.)
——, with ——, Jones, Whorton, Pullman & Eichelberger, 953 (Mal.)
——, with ——, Pullman, Jones, Whorton & Eichelberger, 954 (Mal.)
——, with ——, ——, Whorton, Jones & Eichelberger, 951 (Mal.)
——, Eichelberger, L., Jones, R., Jr., Alving, A. S., Pullman, T. N. & Whorton, C. M., 953 (Mal.)
——, with Jones, Alving, Whorton, Pullman & Eichelberger, 951 (Mal.)
——, with —— Pullman, Whorton, Alving & Eichelberger, 955 (Mal.)
——, ——, Whorton, C. M., Pullman, T. N., Alving, A. S. & Eichelberger, L., 33 (Mal.)
——, with Pullman, Alving, Jones, Whorton & Eichelberger, 865 (Mal.)
——, with ——, ——, Whorton, Jones & Eichelberger, 955 (Mal.)
——, with ——, Eichelberger, Alving, Jones & Whorton, 952 (Mal.)
——, Whorton, C. M., Jones, R., Jr., Pullman, T. N., Alving, A. S. Eichelberger, L. & Rothman, S., 868 (Mal.)
——, with ——, Kirschbaum, Pullman, Jones, Alving, Eichelberger & Coulston, 139 (Mal.)
——, with ——, Pullman, Kirschbaum, Jones, Alving, Eichelberger & Coulston, 235 (Mal.)
——, with ——, Yount, Jones, Alving, Pullman & Eichelberger, 140 (Mal.)
Cram, E. B., 912 (Hel.)
—— & Figgat, W. B., 915 (Hel.)
—— & Files, V. S., 914 (Hel.)
——, —— & Jones, M. F., 913 (Hel.)
Crandall, B. S., 373 (Lab.)
Cretcher, L. H., with Carlson, (576) (Mal.)
van Creveld, S., Arons, P. & de Bruyne, J. I., 1121 (Prot.)
Critchley, M., 270 (Heat Str.)
Crocker, T. T., with Ley & Smadel, 1076 (Typh.)
Crosca, A., with Aversa, 507 (Leish.)
Crosnier, R., Merle, Bernier, Molinier & Tabusse, 1086 (Am.)
Cross, F. W. 928 (Der.)
—— & Howell, A., Jr., 643 (Der.)
Cross, J. B., 117 (Prot.)
Crougue, O., with Chorine, (1014) (Lep.)
Crowther, A. F., with Ashworth, Curd & Rose, (866) (Mal.)
—— Curd, F. H. S. & Rose, F. L., (866) (Mal.)
Cruz, W. O. & de Mello, R. P., 494 (Mal.)
Cuciureanu, I., with Berceanu, 698 (Typh.)
Cuervo, C., with Wharton & Moyer, 808 (Hel.)
Culbertson, J. T., with Rose, H. M., Hernández-Morales, F., Oliver-Gonzalez, J., Figueroa Ortiz, L., Ruiz Reyes, F. & Nettel, R., 101 (Hel.)
Culpepper, G. H., 1123 (Ent.)
——, with Knipling, Bushland, Babers & Raun, 815 (Ent.)
Culver, B., with Spies, Garcia Lopez, Milanes & Lopez Toca, 923 (Sp.)
Culwick, A. T. & Fairbairn, H., 313 (Tryp.)
da Cunha, J. F., with Fox & Kossobudzki, 511 (Y.F.)

da Cunha, M., with Muniz & Nobrega, 55 (Tryp.)
Cunningham, R. W., with Harned, Halliday, Vessey, Yuda, Clark, Hine, Cosgrove & SubbaRow, 628 (Hel.)
Curd, F. H. S., with Ashworth, Crowther & Rose, (866) (Mal.)
——, with Basford, Hoggarth & Rose, (148) (Mal.)
——, with Cliffe, Rose & Scott, (866) (Mal.)
——, with Crowther & Rose, (866) (Mal.)
——, Graham, W., Richardson, D. N. & Rose, F. L., (401) (Mal.)
——, —— & Rose, F. L., (866) (Mal.)
Curnen, F. C., with Melnick & Sabin, (1082) (Den.)
Curpan, C., with Chelărescu, 136 (Mal.)
Cuthbertson, W. W. & Moffatt, J. S., (866) (Mal.)
Cutkomp, L. K., 156 (Mal.)
——, with Hinman, 156 (Mal.)
Cuttle, T. D., (189) (Lep.)

D

Daglio, C. A. N., with Negroni & Fernández, 110 (Der.)
Daily, W. M. & Harrison, T. R., 542 (Heat Str.)
Dalal, P. A., 570 (Mal.)
Damasceno, R. G., with Galvão, 683 (Mal.)
Danaraj, T. J., 1119 (Misc. Dis.)
Danielssen, D. C. & Boeck, C. W., 829 (B.R.)
Darby, W. J., Jones, E., Warden, H. F. & Kaser, M. M., 461 (Sp.)
Darío Fábrega R., (906) (Am.)
Dartevelle, E., with Schwetz, 348 (Hel.)
Das, A. K., with Pasricha, Paul & Das Gupta, 515 *bis*, 601 *bis* (Chl.)
Das Gupta, A. C., with Pasricha, Paul & Das, 515 *bis* (Chl.), 601 *bis* (Chl.)
Das Gupta, C. R., 267 (Haem.)
Das Menon, P., with Savoor & Merchant, 781 (Typh.)
Das Menon, V. K., with Soman, 890 (Typh.)
Datta, P. N., with De, 862 (Mal.)
Davel, J., with Winsser, Verlinde, van Thiel & van der Elst, 1036 (Prot.)
Davey, T. F., 1012 (Lep.)
Davidson, A. G., Baron, B. & Walzer, M., 452 (Hel.)
——, with Kailin & Walzer, 452 *bis* (Hel.)
Davidson, G., 157 & Walzer, 452 *bis* (Hel.)
Davidson, L. S. P. & Girdwood, R. H., 536 (Sp.)
Davidson, R. H., with Peffly & Waters, (969) (Mal.)
Davies, C. W., with Garnham, Heisch & Timms, 86 (R.F.)
Davies, J. N. P., 211, 365, 544, 814, 1118, (Misc. Dis.), 633 (Def. Dis.)
Davis, B. D., 767 (Mal.)
Davis, D. E., 888 (Typh.)
——, with Irons & Murphy, 780 (Typh.)
Davis, E., with Macandrew, (357) (Hel.)
Davis, G. E., (525) (R.F.)
——, Austrian, R. C. & Bell, E. J., 70 (Typh.)
Davis, W. A. & Cleland, R. R., 356 (Hel.)
Davison, A. R., 714 (Lep.)
Dawood, M., with Halawani, Watson, Nor El-Din & Hafez, 797 (Hel.)
Dawson, J. & Findlay, G. M., 497 (Bl.)
Day, A. J., with Trethewie, 812, 1029 (Vms.)
De, M. N. & Datta, P. N., 862 (Mal.)
—— & Dutta, P. N., 34 (Mal.)
Deane, L. M., 232 (Mal.)
Deane, M. P., 417 (Tryp.), 435 (R.F.)
Dearborn, E. H., 397 (Mal.)
Decourt, P., with Bovet, Schneider & Montezin, (873) (Mal.)
—— & Schneider, J., 148 (Mal.)
Decrop, (342) (R.F.)
Defries, R. D., with Campbell, 477 (Rab.)
DeGiusti, D. L., with Yolles, Moore, Ripsom & Meleney, 349 (Hel.)
Dejou, L., (724), 1103 (Hel.)
Delage, B., with Blanc, Bruneau & Poitrot, 892 (Typh.)
De Lamater, E. D., 1030 (Der.)
Delanoë, G., (1057) (Mal.)
Delbove, P., (752) (Mal.)
—— & Reynes, V., 61 *ter* (Typh.)
——, with ——, 61 *bis* (Typh.)
De los Angeles Gonzalez, M., with Sanchez Marroquin, 542 (Der.)
Del Mundo, F., Baltazar, S., Sucgang, E. & Palarca, E., 531 (Hel.)
Del Pozo, E. C., 1106 (Vms.)
Delvoye, with Friess, 466 (Der.)
Demange, J. M., (116) (Misc. Dis.)
Deonier, C. C., Fluno, J. A. & Nottingham, E., 581 (Mal.)
Deonier, C. C., with Incho, 371 (Ent.)
Derrick, E. H., with Streeten, Cohen, Gutteridge, Wilmer, Brown & Smith, 891 (Typh.)
Deschiens, R. & Lamy, L., 629 (Hel.)
—— & Pick, F., (1065) (Mal.)
——, with ——, 350, (800) (Hel.)
—— & Poirier, M., (350) (Hel.)
von Deschwanden, J., 300 (Mal.)
Deshmukh, P. L., (492) (Mal.)
Dethier, V. G., 829 (B.R.)
Devors, P., 818 (Reports, etc.)
Dewhurst, K. E., 811 (Haem.)
Dharmendra, 612, 791 (Lep.)
—— & Chatterjee, K. R., 793 (Lep.)
—— & Sen, N., 714 (Lep.)
Diamond, L. S., with Hunter, Hodges, Jahnes & Ingalls, 623 (Hel.)
Dias, A. de C., 58 (Typh.)
Dias, E., 1072 (Tryp.)
——, Laranja, F. S. & Nobrega, G., (881) (Tryp.)
——, with —— & ——, 589 (Tryp.)
Dick, G. W. A. & Lewis, E. A., 328 (Typh.)
Dick, M. I. B., Harrison, I. T. & Farrer, K. T. H., (1027) *bis* (Sp.)
Dignat, M., with Schneider, Voron & Sfar, 868 (Mal.)
Diller, W. F., 101 (Hel.)
Dillon, M. L. & Cooper, G. R., 710 (Ys.)
Divekar, P. V., with Bhatnagar, Fernandes & de Sa, 516 (Chl.)
——, with ——, de Sa & Fernandes, 601 (Chl.)
Dobell, C., 518 (Am.)
Dobson, J., Hutchison, W. C. & Kermack, W. O., (576) (Mal.)
Docq, M., with van Meerbeeck, 1062 (Mal.)
Documents Algériens, (550) (Reports, etc.)

Dodd, M. C., 52 (Tryp.)
Doeleman, H. & van Thiel, P. H., 670 (Mal.)
Dolgopol, V. B., 703 (Typh.)
Donaldson, A. W., with Brooke, 1056 (Mal.)
Donaldson, R., with King, Gilchrist, Wootton, Sisson, Macfarlane, Jope, O'Brien, Peterson & Strangeways, 359 (Haem.)
Donoso, R., with Neghme, Faiguenbaum, Pizzi, Roman, Hoecker, Brncic, Agosin, Christen, Sotomayor, Silva & Vilches, 356 (Hel.)
Donoso Barros, R., 469 (Misc. Dis.)
Dore, G. M., (418) (Leish.)
Dormer, B. A. & Scher, P., (110) (Der.)
Dos Santos, J. C., (351) (Hel.)
Dostrovsky, A. & Sagher, F., 465 (Der.)
Douglas, B., Jacomb, R. G. & Kermack, W. O., (401) (Mal.)
Douglas, C. G., with Macfarlane, O'Brien, Jope, Jope, Mole, Amos & Quelch, 358 (Haem.)
Douglas, D. M., (625) (Hel.)
Doull, J. A., Guinto, R. S., Bancroft, H. & Rodriguez, J. N., 525 (Lep.)
Dowling, E. J., with Harries, Lewis & Waring, 546 (Misc. Dis.)
Downing, J. G., (911) (Ys.)
Drake, E. H. & Warthin, T. A., 1086 (Am.)
Dresden, D. & Krijgsman, B. J., 653 (Ent.)
Drill, V. A. & Loomis, T. A., 1023 (Def. Dis.)
Drouhet, E., with Badenski, 591 (Typh.)
Drummel, G., (734) (Misc. Dis.)
Duarte, E., with Torres, Muniz & Cardoso, 776 (Leish.)
Dubin, I. N., Reese, J. D. & Seamans, L. A., 547 (Ent.)
Dubois, A., 235 (Mal.), 436, 438 (Lep.)
—— & Duren, A., 1039 (Reports, etc.)
Duboucher, G., with Lebon, Maire & Claude, (83) (Am.)
Dudgeon, J. A., with Caughey, 168 (Typh.)
Duffy, B. J., with Glasgow, 245 (Tryp.)
Duggan, A. J., 502 (Tryp.)
Dulaney, A. D., with Priest, J. B., Almeda, M. L. & Parker, B., 857 (Mal.)
——, Constantinesco, S., Botez, V. & Sturdza, N., 1076 (Typh.)
Dumitresco, N., with Combiesco & Vasiliu, 169 (Typh.)
Duncan, N. A. (723) (Hel.)
Dunn, J. H., with Elderfield, Kreysa & Humphreys, (491) (Mal.)
Dunn, T. B., 781 (Typh.)
Dunoyer, M., with Levaditi & Vaisman, 290 (Rab.)
Duport, M., with Zotta, Radacovici, Teodorescu, Georgescu, Mardare, Atanasiu & Trifon, 133 (Mal.)
Durand-Delacre, R., with Parrot, (470) (Ent.)
Duren, A., with Dubois, 1039 (Reports, etc.)
Durieux, C., Trenous, J. & Tanguy, F., 905 (Am.)
Dutra, F. N., with Blumenthal, Paschal & Kuhn, 337 (Am.)
Dutta, P. N., with De, 34 (Mal.)
Duvolon, S., with Stefanopoulo, 252 (Y.F.)
Dwinelle, J. H., Sheldon, A. J., Rein, C. R. & Sternberg, T. H., 87 (Ys.)
Dwork, K. G., 1005 (Am.)

E

Eakin, R. E., with Smith, Steele & Cowie, 985 (Leish.)
Earle, D. P., Jr., with Berliner, Taggart, Welch, Zubrod, Knowlton, Atchley & Shannon, 961 (Mal.)
——, Jr. ——, ——, Welch, W. J., Zubrod, C. G., Wise, N. B., Chalmers, T. C., Greif, R. L. & Shannon, J. A., 957 (Mal.)
——, Jr., ——, ——, Zubrod, C. G., Welch, W. J., Bigelow, F. S., Kennedy, T. J., Jr. & Shannon, J. A., 963 (Mal.)
——, with ——, ——, Zubrod, Welch, Conan, Bauman, Scudder & Shannon, 960 (Mal.)
——, Bigelow, F. S., Zubrod, C. G. & Kane, C. A., 962 (Mal.)
——, with Shannon, Berliner & Taggart, 956 (Mal.)
——, with Taggart, Berliner, Welch, Zubrod, Jailer, Kuhn, Norwood & Shannon, 960 (Mal.)
——, with ——, ——, Zubrod, Welch, Wise, Schroeder, London & Shannon, 958 (Mal.)
——, Welch, W. J. & Shannon, J. A., 959 (Mal.)
Earle, K. V., 1029 (Vms.)
East Africa High Commission, 982 (Tryp.)
East African Med. J., 656 (Reports, etc.)
Eddey, L. G., 1041 (Reports, etc.)
Edney, E. B., 332 (Pl.)
Edelman, M. H., with Spingarn, 428 (Am.)
Eeraerts, W., 412 (Tryp.)
Ehrlich, J., Bartz, Q. R., Smith, R. M. & Joslyn, D. A., 779 (Typh.)
Eichbaum, F. W., (268) (Vms.)
Eichelberger, L., with Alving, Craige, Jones, Whorton & Pullman, 953, 956 (Mal.)
——, with ——, ——, Pullman, Whorton & Jones, 951 (Mal.)
——, with ——, Pullman, Craige, Jones & Whorton, 954 (Mal.)
——, with Craige, Alving, Jones, Whorton & Pullman, 139 (Mal.)
——, with ——, Jones, Alving, Pullman & Whorton, 953 (Mal.)
——, with ——, ——, Whorton, Pullman & Alving, 33 (Mal.)
——, with ——, Whorton, Jones, Pullman, Alving & Rothman, 868 (Mal.)
——, with Jones, Craige, Alving, Whorton & Pullman, 951 (Mal.)
——, with ——, Pullman, Whorton, Craige & Alving, 955 (Mal.)
——, with Pullman, Alving, Jones, Craige & Whorton, 952 (Mal.)
——, with ——, ——, ——, Whorton & Craige, 865 (Mal.)
——, with ——, Craige, Alving, Whorton & Jones, 955 (Mal.)
——, with Whorton, Kirschbaum, Pullman, Jones, Craige, Alving & Coulston, 139 (Mal.)
——, with ——, Pullman, Kirschbaum, Jones, Alving, Craige & Coulston, 235 (Mal.)
——, with ——, Young, Jones, Alving, Pullman & Craige, 140 (Mal.)
Eichna, L. W., with Nelson, Horvath, Shelley & Hatch, 731 (Heat Str.)
——, with ——, Shelley, Horvath & Hatch, 732 (Heat Str.)

Eisenbeth, R., with Benhamou, Albou & Zermati, 302 (Mal.)
Eissa, A., with Gohar, Elyan, Makkawi & Bashatly, 897 (Chl.)
Eklund, C. M., Parker, R. R. & Lackman, D. B., 71 (Typh.)
Elder, H. H. A., 205 (Sp.)
Elderfield, R. C., Kreysa, F. J., Dunn, J. H. & Humphreys, D. D., (491) (Mal.)
El-Din Nour El-Din, G., 1060 (Mal.)
El Ghaffar, Y. A., 905 (Am.)
Ellerbrook, L. D., with Lippincott, Rhees & Mason, 527 (Hel.)
Elliott, M. E., with Burrows & Havens, 335 (Chl.)
——, with ——, Mather & Havens, 178 (Chl.)
Ellis, F. P., 271 (Heat Str.)
Ellis, J. M., with Young & Stubbs, 236 (Mal.)
Elmendorf, J. E., Jr., with Barnhill, K. G., Hoekenga, M. T. & Takos, M., 1064 (Mal.)
Elmes, B. G. T. & Baldwin, R. B. T., 650 (Misc. Dis.)
——, with Findlay, 322 (Typh.)
El-Ramly, A. H., 185 (R.F.), 900 (Chl.)
Elsdon-Dew, R., 189 (Hel.)
El-Sherif, A., with Ibrahim & Sorour, 914 (Hel.)
Elyan, A., with Gohar, Makkawi, Eissa & Bashatly, 897 (Chl.)
Emmons, C. W., Bell, J. A. & Olson, B. J., 207 (Der.)
Enigk, K., 1123 (Ent.)
——, with Nauck, Vogel, Reichenow, Westphal & Weyer, 1137 (B.R.)
Enriquez-Navarro, A. F. & Rognoni, M., (1061) (Mal.)
Epstein, S., 535 (Def. Dis.)
Ercole, Q. N., with Mackerras, 305 (Mal.)
Ercoli, N. & Wilson, W., 773 (Tryp.)
Erfan Bey, M., (349) (Hel.)
Erfan, M. & Talaat, S., 715 (Hel.)
Erhardt, A. E., (1020), 1023 (Hel.)
Erickson, A. G., 46 (Mal.)
Erickson, P. T., with Faget, 442, 615 (Lep.)
——, with Fite, Gemar & Johansen, 442 (Lep.)
——, with Johansen, 615 (Lep.)
Erzin, N. & Payzin, S., 426 (Pl.)
Eskey, C. R. & Hemphill, F. M., 990 (Typh.)
Eskola, O., 1098 (Hel.)
Estela Gastelo, M. A., 570 (Mal.)
Estes, J. E., Farber, E. M. & Stickney, J. M., 538 (Haem.)
Evans, R. R., with Warthin & Levine, 753 (Mal.)
Evans, W. E., Jr., with Krantz, 52 (Tryp.)
Everard, A., with Mole, 538 (Vms.)
Everritt, M. G., with Faust, Lewis, Heilbrunn & Hickman, 902 (Am.)
Eyles, D. E. & Young, M. D., 859 (Mal.)
——, with ——, 680 (Mal.)
——, —— & Burgess, R. W., 1052 (Mal.)

F

Faget, G. H. & Erickson, P. T., 442, 615 (Lep.)
Fahey, R. J., with Morgan, Neva & Finland, 887 (Typh.)
Faiguenbaum, J., with Neghme, Pizzi, Roman, Donoso, Hoecker, Brncic, Agosin, Christen, Sotomayor, Silva & Vilches, 356 (Hel.)
Fain, A., 100 (Hel.), (734) (Misc. Dis.)
—— & Henrard, C., 967 (Mal.)
Fairbairn, H., 50 (Tryp.)
——, with Culwick, 313 (Tryp.)
Fairchild, G. B., with Hertig, 844 (Leish.)
Fairley, N. H., 20 (Mal.), 101 (Hel.), (126) (Reports, etc.)
Farber, E. M., with Estes & Stickney, 538 (Haem.)
Farrell, E., 579 (Mal.)
Farrer, K. T. H., with Dick & Harrison (1027) *bis* (Sp.)
Farreras Valentí, P. (641) (Haem.)
Fouré, with Gaud & Solé, 1015 (Hel.)
Faust, E. C., 426 (Pl.), 716 (Hel.)
——, Lewis, R., Heilbrunn, I., Hickman, M. L. M. & Everritt, M. G., 902 (Am.)
——, Scott, J. A. & McDaniel, G. E., 231 (Mal.)
Fay, R. W., Cole, E. L. & Buckner, A. J., 372 (Ent.)
——, —— & Simmons, S. W., 1037 (Ent.)
——, with McCauley & Simmons, 760 (Mal.)
Feigelson, P., with Manwell, 1124 (Lab.)
Feldman, H. A., with Overman, 766 (Mal.)
Felsenfeld, O., with Young, 1005 (Am.)
Ferguson, F. F., with Simmons & Upholt, 581 (Mal.)
Ferguson, M. S. & Graham, O. H., 652 (Ent.)
Fernandes, F., with Bhatnagar, de Sa & Divekar, 516, 601 (Chl.)
Fernández, J. M. M. & Bergel, M., 911, 1013 (Lep.)
——, Carboni, E. & Tomassino, P., 1012 (Lep.)
—— & Mercau, R., 611 (Lep.)
Fernández, L. L., with Negroni & Daglio, 110 (Der.)
Fernández Chapela, A., with Piaggio Blanco & Paseyro, (1023) (Hel.)
Fernández Meléndez, A., 138 (Mal.)
Ferola, R., (443) (Hel.)
Ferraro, F., 229 (Mal.)
Ferreira, F. S. da C., (1069) *ter.* (Tryp.)
Ferreira, M. O., with Pinotti & Rachou, 1053 (Mal.)
——, with Rachou, (234) (Mal.)
Ferro-Luzzi, G., 931 (Misc. Dis.) 1017 (Hel.), 1024 (Def. Dis.)
—— & Ferro-Luzzi, S., 249 (Typh.)
Ferro-Luzzi, S., with Ferro-Luzzi, 249 (Typh.)
Field, J. W., 861 (Mal.)
——, Johnston, R. S. & Smith, H., 577 (Mal.)
Figgat, W. B., with Cram, 915 (Hel.)
——, with Jones, Newton, Weibel, Warren & Steinle, 917 (Hel.)
Figueroa Ortiz, L., with Culbertson, Rose, Hernandez-Morales, Oliver-Gonzalez, Ruiz Reyes & Nettel, 101 (Hel.)
Files, V. S., with von Brand, 526 (Hel.)
——, with Cram, 914 (Hel.)
——, with —— & Jones, 913 (Hel.)
Filho, E. S. & Castro, E. L., 1088 (Am.)
Finch, C. A., with Burwell & Kinney, 311 (Bl.)
Findlay, G. M., (1080) (Y.F.)
—— & Archer, G. T. L., 782 (Typh.)
——, Boulter, E. A. & MacGibbon, C. B., 206 (Haem.)
——, with Dawson, 497 (Bl.)
—— & Elmes, B. G. T., 322 (Typh.)

Finland, M., with Morgan, Neva & Fahey, 887 (Typh.)
Fiol, H., Jonquieres, E. D. L., Brusco, C. M., Melamed, A. J. & Firpo, C. J., 1011 (Lep.)
Firlotte, W. R., 1019 (Hel.)
Firpo, C. J., with Fiol, Jonquieres, Brusco & Melamed, 1011 (Lep.)
Fisher, A. C., Fisher, M. M. & Lendrum, A. C., 545 (Misc. Dis.)
Fisher, M. M., with Fisher & Lendrum, 545 (Misc. Dis.)
Fite, G. L., Erickson, P. T., Gemar, F. & Johansen, F. A., 442 (Lep.)
Fitzhugh, O. G., Nelson, A. A. & Holland, O. L., 973 (Mal.)
Fitzpatrick, F. K., 781 (Typh.)
Flachs, A., 1026 (Def. Dis.)
Fleming, J., with Miller (1100) (Hel.)
Fleming, R. F. & French, J. M., 73 (Den.)
Fletcher, O. K., Jr. & Krause, J. B., 761 (Mal.)
Floch, H., 437 (Lep.), (506) (Tryp.), 550 (Reports, etc.), 749 (Mal.)
—— & Abonnenc, E., (547), (548) (Ent.)
—— & Camain, R., 250 (Typh.), (442), (610) (Lep.), (506), (1073) (Tryp.)
—— & de Lajudie, P., 627 (Hel.)
Florestano, H. J. & Bahler, M. E., 516 (Chl.)
Florio, L. & Miller, M. S., 512 (Den.)
Flowers, W. S., 1109 (Oph.)
Fluno, J. A., with Deonier & Nottingham, 581 (Mal.)
Folkers, K., with Kuehl & Spencer, (866) (Mal.)
Fonte, J. & Rossell, C. S. C., 1091 (Lep.)
Fonzari, M., 465 (Der.)
Forbus, W. D. & Bestebreurtje, A. M., 269 (Der.)
Fort, M., with Schwetz & Baumann, 231, 748 *bis* (Mal.)
——, with ——, —— & Beumer, 230 (Mal.)
Foster, L. E., with Quan, Larson & Meyer, 597 (Pl.)
——, with Meyer, 896 (Pl.)
Fourman, L. P. R., 460 (Sp.)
——, with Black, 105 (Sp.)
Fowden, L., with Borrow, Stedman, Waterlow & Webb, 729 (Def. Dis.)
Fox, J. P., 889 (Typh.)
——, with Clarke, 986 (Typh.)
——, da Cunha, J. F. & Kossobudzki, S. L., 511 (Y.F.)
—— & Peterson, O. L., 592 (Typh.)
——, with Smadel, Snyder, Jackson & Hamilton, 168 (Typh.)
Frank, H. R. & May, K. H., 988 (Typh.)
Franke, R., 777 (Typh.)
Frankland, A. W., 730 (Def. Dis.)
Franks, M. B., Chenoweth, B. M., Jr. & Stoll, N. R., 453 (Hel.)
Frazer, A. C., 105 (Sp.)
——, with Cooke, Peeney, Sammons & Thompson, 535 (Sp.)
Frear, D. E. H. & Seiferle, E. J., (373) (Ent.)
de Freitas, G. & de Castro, F. T., 1073 (Tryp.)
de Freitas, J. L. P., 315 (Tryp.)
French, J. M., with Fleming, 73 (Den.)
Freudenberg, E., 369 (Prot.)
Freund, J., with Thomson, Sommer & Walter, 49 (Mal.)
——, ——, ——, —— & Pisani, T. M., 766 (Mal.)
Frieden, E. H., with Pomerat & Yeager, (170) (Bart.)
Friedenberg, S., 647 (Oph.)
Friedman, H., with Klatskin, 904 (Am.)
Friedrich-Freksa, H., with Weyer & Bergold, 1075 (Typh.)
Friess & Delvoye, 466 (Der.)
Fritz, R. F., with Bradley, 42 (Mal.)
Froes, H. P., (511) (Y.F.)
Frohne, W. C., with Young, Hardman, Burgess & Sabrosky, 674 (Mal.)
——, with Weathersbee, 752 (Mal.)
Fry, N., with Wright & Bauman, 527, 529 (Hel.)
Frye, W. W., with Shaffer, 786 (Am.)
——, with —— & Ryden, 1001 (Am.)
——, with —— & Walton, 787 (Am.)
Fu, F. Y., with Chou & Kao, 755 (Mal.)
——, with Jang, Huang & Wang, 578 (Mal.)
Fu, H. H., with Wang & Liu, 777 (Typh.)
Fulton, J. D., 508 (Leish.)
—— & Joyner, L. P., 430 (Am.), 775 (Leish.)
——, with Rimington & Sheinman, 244 (Mal.)
Furcolow, M. L., Bunnell, I. L. & Tenenberg, D. J., 644 (Der.)
Furtado, T. A. & Pellegrino, J., 645 (Der.)

G.

Gaase, A., 987 (Typh.)
Gabaldon, A. & Cova-Garcia, P., (138), 573 (Mal.)
Gabus, J., (655) (Reports, etc.)
Gachkel, with Aubin, Zangerlin & Gallo, 183 (R.F.)
Gage, J. C., Rose, F. L. & Scott, M. M. (588) (Tryp.)
Gaillard, B. D. E., with Baumann, 544 (Misc. Dis.)
Gaines, T. B., with Nicholson, 598 (Pl.)
Galeano Muñoz, J., with Surraco, (98) (Hel.)
Gall, D., 936 (Lab.)
——, with Andrews & Maegraith, 491 (Mal.)
——, with Maegraith & Andrews, 234 (Mal.)
Galley, W., with Symes, Hadaway & Barlow, 588 (Tryp.)
Galliard, H., 264, 801 (Hel.)
——, Huard, P. & Ngu, D. V., 1101 (Hel.)
—— & Ngu, D. V., 259 (Hel.)
Gallo, M., with Aubin, Gachkel & Zangerlin, 183 (R.F.)
Gallo, P. & Vogelsang, E. G., 116 (Misc. Dis.)
Gallut, J., 177, 600 (Chl.)
—— & Grabar, P., 427 (Chl.)
Galvão, A. L. A. & Damasceno, R. G., 683 (Mal.)
Gambles, R. M., with Coghill, 709 (R.F.)
Gamboa, E. L., with Lantin & Geronimo, (509) (Typh.)
Gan, T. M., with Lara, Matias & Reyes, 351 (Hel.)
Ganguli, N., 752 (Mal.)
Garaci, C., 671 (Mal.)
Garcia Lopez, G., with Spies, Milanes, Lopez Toca & Culver, 923 (Sp.)
——, with ——, Stone, Milanes, Brandenburg & Aramburu, 460 (Sp.)

——, with ——, ——, ——, Toca & Aramburu, 462 (Haem.)
Garcia Martinez, A., with Sanchis Bayarri & Paris Pellicer, (800) (Hel.)
Garnham, P. C. C., 121, 653 (Ent.), 683 (Mal.)
——, Davies, C. W., Heisch, R. B & Timms, G. L., 86 (R.F.)
——, with Heisch, 603 (R.F.)
——, with Shortt, 388, 762 *bis*, 872 (Mal.)
——, with ——, Covell & Shute, 482 (Mal.)
——, with —— & Malamos, 388 (Mal.)
Gartrell, F. E. & Kiker, C. C., 760 (Mal.)
Gass, H. H., (715) (Lep.)
Gatto, I., 418 (Leish.)
Gaud, J., Fauré & Solé, 1015 (Hel.)
—— & Maurice, A., 912 (Hel.)
Gaud, M., Khalil Bey, M. & Vaucel, M., 432 (R.F.)
—— & Morgan, M. T., 431 (R.F.)
Gauld, R. L., with Plotz, Bennett, Wertman & Snyder, 699 (Typh.)
——, with Scoville, Bennett & Wertman, 700 (Typh.)
——, with Smadel & Jackson, 321 (Typh.)
Gayton, J. L., Bellis, M. & McClenanan, W. H., 809 (Hel.)
Gear, H. S., 770 (Tryp.)
Gear, J., with de Meillon, 119 (Ent.)
Gear, J. H. S., with Wolstenholme, 434 (R.F.)
Gébert, S., with Tonking, 241 (Mal.)
Geigy, R., 873 (Tryp.)
Geiling, E. M. K., with Chen, 490 (Mal.), 691 (Tryp.)
Gelfand, H. M., 137 (Mal.)
Gelfand, M., 107 (Sp.), 276, 551 (B.R.), 411 (Tryp.), 721, 796, 913 (Hel.)
Gemar, F., with Fite, Erickson & Johansen, 442 (Lep.)
Gennis, J., with Straus, 974 (Mal.)
Georgescu, M., with Zotta, Radacovici, Teodorescu, Mardare, Duport, Atanasiu & Trifon, 133 (Mal.)
Geronimo, A., with Lantin & Gamboa, (509) (Typh.)
Ghodssi, M., 292 (Rab.)
Ghosal, S. M. & Sinha, Y. K., 882 (Leish.)
Ghosh, B. N., 862 (Mal.)
—— & Ghosh, T. K., 147 (Mal.)
Ghosh, H. & Ghosh, N. N., 692 *bis* (Leish.)
——, with Ghosh & Ray, 1002 (Am.)
Ghosh, N. N., with Ghosh, 692 *bis* (Leish.)
——, Ghosh, H. & Ray, J. C., 1002 (Am.)
Ghosh, S. K., (1084) (Am.)
Ghosh, T. K., with Ghosh, 147 (Mal.)
Gi, J., with Romaña, 316 (Tryp.)
Giglioli, G., 299, 485, 976 (Mal.), 628 (Hel.)
——, with Stage, 308 (Mal.)
Gil, J. A., with Benaim Pinto, Carbonell & Gómez, (206) (Haem.)
Gilbert, C., with Gillman & Gillman, 727 (Def. Dis.)
Gilchrist, H., with Ruegsegger, (333) (Pl.)
Gilchrist, M., with King, Wootton, Donaldson, Sisson, Macfarlane, Jope, O'Brien, Peterson & Strangeways, 359 (Haem.)
Gill, E. G., 1110 (Oph.)
Gillette, H. P. S., with Stage, 572 (Mal.)
Gillman, J., Gilbert, C. & Gillman, T., 727 (Def. Dis.)
—— & Gillman, T., 632 (Def. Dis.)
Gillman, T., with Gillman, 632 (Def. Dis.)
——, with —— Gilbert, 727 (Def. Dis.)
Gilroy, A. B., 1043 (B.R.)
Gingrich, W. D., 980 (Mal.)
Girard, G., 173 (Pl.), 595 (Den.)
——, with Sandor, Skrobisz & Chevallier, 994 (Pl.)
Giraud, P., Bernard, R. & Bergier, P., 984 (Leish.)
Girdwood, R. H., 1104 (Haem.)
——, with Davidson, 536 (Sp.)
Girgis, B. & Aziz, S., 446 (Hel.)
Giroud, P., 420 (Typh.)
—— & Ciaccio, G., 60, 885 (Typh.)
—— & Jadin, J., 60, 697 (Typh.)
——, with ——, 592 (Typh.)
—— & Jezierski, A., 777 (Typh.)
—— & Jude, A., 167 (Typh.)
—— & Le Gac, P., 1076 (Typh.)
——, with Sandor, 166 (Typh.)
——, with —— & Skrobisz, 986 (Typh.)
—— & Vargues, R., 1075 (Typh.)
Giva, A. & Binaghi, G., 1074 (Leish.)
Gjullin, C. M., with Yates, 371 (Ent.)
Glasgow, J. P. & Duffy, B. J., 245 (Tryp.)
Glasgow, R. D., (243) (Mal.)
Glauner, W., 1006 (Am.)
Glusman, M., (459) (Def. Dis.)
Godfrey, E. W., with Hays & Brown, 519 (Am.)
Goette, M. B., with Schmitz, 470 (Ent.)
Gohar, M. A., 600, (706), 901 (Chl.)
——, Elyan, A., Makkawi, M., Eissa, A. & Bashatly, A., 897 (Chl.)
—— & Isa, A. A., 1000 (Chl.)
—— & Makkawi, M., 705 *bis*, 706 (Chl.)
Golberg, L. & de Meillon, B., (149) (Mal.)
Goldberg, L. C., with Wexler & Adams, 27 (Mal.)
Golden, H., with Kullman, 518 (Am.)
Goldman, L., 247 (Leish.)
Golem, S. B., with Payzin, 891 (Typh.)
Gomes, R. P., with Russo, 930 (Der.)
Gómez, O. L., with Benaim Pinto, Carbonell & Gil, (206) (Haem.)
Gonzalez, R. E., with Aguirre Pequeño, 1030 (Der.)
González Castro, J., 197 (Hel.)
González Ochoa, A. & Soto Figueroa, E., 270 (Der.)
González Prendes, M. A., with Ybarra Pérez, 437 (Lep.)
Goodall, H. I., with Goodall & Banerjee, 360 (Haem.)
Goodall, J. W. D., Goodall, H. I. & Banerjee, D., 360 (Haem.)
Gooden, E. L., 120 (Ent.)
Goodman, L., 910 (Ys.)
Goodman, W. L., with Johnson, 45 (Mal.)
Goodson, J. A., Goodwin, L. G., Gorvin, J. H., Goss, M. D., Kirby, K. S., Lock, J. A., Neal, R. A., Sharp, T. M. & Solomon, W., 521 *bis* (Am.)
Goodwin, L. G., 76 (Am.), 101 (Hel.)
——, with Goodson, Gorvin, Goss, Kirby, Lock, Neal, Sharp & Soloman, 521 *bis* (Am.)
——, Hoare, C. A. & Sharp, T. M., 521 (Am.)

Goodwin, M. B., with Hauschka, (881) (Tryp.)
Goodyear, W. E. & Beard, D. E., 160 (Bl.)
Gordon, D. M., 646 (Oph.)
Gordon, E. S., with Albright & Tabern, 181 (Am.)
Gordon, J. E., with Aycock, 186 (Lep.)
Gorman, S., Meeser, C. V., Ross, W. F. & Blair, D. M., 258 (Hel.)
Gorvin, J. H., with Goodson, Goodwin, Goss, Kirby, Lock, Neal, Sharp & Solomon, 521 *bis* (Am.)
Gosden, M., with Apted & Harding, 1089 (Ys.)
—— & Reid, J. D., 639 (Haem.)
Goss, M. D., with Goodson, Goodwin, Gorvin, Kirby, Lock, Neal, Sharp & Solomon, 521 *bis* (Am.)
Goswami, A., with Afridi, Ramakrishnan & Menon, 239 (Mal.)
Gouck, H. K., with Smith, 548 (Ent.)
Gouère, P., with Constant, 928 (Vms.)
Gounelle, H., 1104 (Def. Dis.)
Goytia, R. S., 324 (Typh.)
Grabar, P., with Gallut, 427 (Chl.)
Graham, O. H., with Ferguson, 652 (Ent.)
Graham, W., with Curd, Richardson & Rose, (401) (Mal.)
——, with —— & Rose, (866) (Mal.)
Gramiccia, G. & Black, R. H., 685 (Mal.)
——, with Rita, 158 (Mal.)
—— & Saccà, G., 408 (Mal.)
Granett, P. & Sacktor, B., 121 (Ent.)
Grant, J. L., with Rawson & Collins, 929 (Der.)
Grasset, E., 540 (Vms.)
—— & Christensen, P. A., 268 (Vms.)
Gray, H. F., 309 (Mal.)
Gray, W. H., 711 (Lep.)
Greiff, D. & Pinkerton, H., 509 (Typh.)
Greif, R. L., with Earle, Berliner, Taggart, Welch, Zubrod, Wise, Chalmers & Shannon, 957 (Mal.)
Greenberg, M. & Pellitteri, O., 71 (Typh.)
Greene, E., with Hunter, Bennett & Ingalls, 349 (Hel.)
Grenier, P., (213) (Ent.)
Greppin, J., 707 (Chl.)
Griffin, A. M., with Rees, Reardon, Jones & Bartgis, 79 (Am.)
Grocott, J. F. L., 733 (Heat Str.)
Grocott, R. G., with Kean, 470, 650 (Prot.)
Groenendijk, H. J., (885) (Typh.)
Gross, S. J., 341 (Am.)
Grossowicz, N., with Rabinowitz & Aschner, 986 (Typh.)
Gsell, O., 327 (Typh.)
Guerrisi, G., 591 (Typh.)
Guevara, R., 263 (Hel.)
Guideri, G., 418 (Leish.)
Guimarães, F. N., 344 (Ys.), 508 (Leish), 648 (Misc. Dis.)
—— & Meyer, H., 368 (Prot.)
Guinto, R. S. with Doull Bancroft & Rodriguez, 525 (Lep.)
Gujar B. J. with Brumpt, (1100) (Hel.)
Gunther, F. A., 548 (Ent.)
Gupta, D. C., with Chand, (368) (Misc. Dis.)
Gupta, J. C., with Mullick, 755 (Mal.)
Gutch, C F., 209 (Ulc.)
Gutierrez, P. D., Lozano, A. A. & Pesigan, T. P., 259 (Hel.)
Gutteridge, N. M., with Streeten, Cohen, Wilmer, Brown, Smith & Derrick, 891 (Typh.)
Guyane Française, 550 (Reports, etc.)
Guzman, F. & Morales, P., (264) (Hel.)
György, P., with Caldwell, 417 (Tryp.)

H

Haas, V. H., 228, 855 (Mal.)
—— & Akins, H., 310 (Mal.)
Habel, K. & Wright, J. T., 478 (Rab.)
Habibi, (247) (Leish.)
Habibi, M., 111 (Der.)
Hackett, L. W., with Putnam, 152 (Mal.)
Hadaway, A. & Barlow, F., 371 (Ent.)
Hadaway, A. B., with Symes, Barlow & Galley, 588 (Tryp.)
Haddad, C. & Valero, A., 784 (Pl.)
Hadjinikolau, J. & Busvine, J. R., 936 (Ent.)
Hadler, W. A., 464 (Der.)
Haedicke, T. A., with Burchenal & Bowers, 319 (Leish.)
——, with Wilner, 1074 (Leish.)
Haeger, J. S., with Basham, (969) (Mal.)
Hafez, A., with Halawani, Watson, Nor El-Din & Dawood, 797 (Hel.)
Haiba, M. H., 769 (Mal.)
Hairston, N. G., Bang, F. B. & Maier, J., 22 (Mal.)
——, with ——, —— & Roberts, 45 (Mal.)
——, with Maier & Bang, 860 (Mal.)
Haislip, D. B., with Chapman & Schwartz, 788 (Am.)
Halawani, A., 94 (Hel.), 183 (R.F.)
——, Baz, I. & Morkos, F., 681 (Mal.)
——, with Khalil, 527 (Hel.)
——, Newsome, J. & Wootton, I. D. P., 721 (Hel.)
—— & Omar, A. A. 707 (Chl.)
——, with Watson & Abdel Azim, 1018 (Hel.)
——, ——, Nor-El-Din, G., Hafez, A. & Dawood, M., 797 (Hel.)
v. Haller, E., 970 (Mal.)
Halliday, S., with Harned, Cunningham, Vessey, Yuda, Clark, Hine, Cosgrove & SubbaRow, 628 (Hel.)
Hambly, A. S., Jr., with Anderson, Johnstone, Packer, Young, Callison, Anderson & Reed, 903 (Am.)
Hamburg, 375 (Reports, etc.)
Hamilton, H. L., with Smadel, Snyder, Jackson & Fox, 168 (Typh.)
Hammel, L., 341 (Am.)
Hammick, D. L., with Brown, (491) (Mal.)
Hampton, J. W. F., 56 (Leish.)
Hanafy, M., 458 (Def. Dis.)
Hannum, C. A., with Liebow & Milliken, 908 (Am.)
Hansen, E. L., with Anderson, 517 (Am.)
——, ——, Sah & Cafiso, 520 (Am.)
Harant, H. & Baur, O., 652 (Ent.)
Harbitz, F., 607 (Lep.)
Harding, R. D., with Apted & Gosden, 1089 (Ys.)
—— & Hutchinson, M. P., 410 (Tryp.)
Hardman, N. F., 298 (Mal.)
——, with Young, Burgess, Frohne & Sabrosky, 674 (Mal.)

Hardy, F., with de Meillon & Thorp, 789 (R.F.)
Hare, K., 1032 (Ulc.)
Hargreaves, W. H., with Collard, 320 (Leish.)
Harned, B. K., Cunningham, R. W., Halliday, S., Vessey, R. E., Yuda, N. N., Clark, M. C., Hine, C. H., Cosgrove, R. & SubbaRow, Y., 628 (Hel.)
Harrell, E. R. Jr., with Smith, 814 (Der.)
Harrell, G. T., with Kelsey, 1079 (Typh.)
Harries, E. J., Lewis, A. A. G., Waring, J. W. B. & Dowling, E. J., 546 (Misc. Dis.)
Harris, L. J., with Kodicek & Carpenter, 104 (Def. Dis.)
Harrison, H. E., Bunting, H., Ordway, N. K. & Albrink, W. S., 498 (Bl.)
Harrison, I. T., with Dick & Farrer, (1027) *bis* (Sp.)
Harrison, T. R., with Daily, 542 (Heat Str.)
Hartmann, F. W., 185 (R.F.)
Hartz, P. H., Hugenholtz, M. J. & van der Sar, A. 200 (Hel.)
—— & van de Stadt, F. R., 352 (Hel.)
Harvey, N. A., 645 (Der.)
Harvey, S. C., 690 (Tryp.)
Hassan, A., 998 (Chl.)
Hatch, T. F., with Nelson, Eichna, Horvath & Shelley, 731 (Heat Str.)
——, with ——, Shelley, Horvath & Eichna, 732 (Heat Str.)
Hathaway, C. R., with Lima, 173 (Pl.)
Hauschka, T. & Goodwin, M.B., (881) (Tryp.)
Hauschka, T. S., 415 (Tryp.)
Havens, L., with Burrows, 898 (Chl.)
——, with —— & Elliott, 335 (Chl.)
——, with ——, Mather & Elliott, 178 (Chl.)
Hawking, F., 101 (Hel.) (126) (Reports, etc.) 388 (Mal.), 506 (Leish.)
——, with Blair & Ross, 526 (Hel.)
—— & Hunt, R., 494 (Mal.)
——, Perry, W. L. M. & Thurston, J. P., 685 (Mal.)
—— & Ross, W. F., 798 (Hel.)
——, with Tonkin, 243, 409 (Mal.)
Haworth, R. D. & Robinson, S., (866) (Mal.)
Hayes, G. S., with Causey & Laemmert, 992 (Y.F.)
Hays, T. G., Brown, R. B. & Godfrey, E. W., 519 (Am.)
Heaslip, W. G., 251 (Typh.)
Heath, D. F., Thomas, M. G. & Wilson, J. F., 1109 (Oph.)
Hegh, E., 275 (B.R.)
Heilbron, I., 757 (Mal.)
Heilbrunn, I., with Faust, Lewis, Hickman & Everritt, 902 (Am.)
Heilig, R. & Sachdev, R. N., 246 (Leish.)
Heisch, R. B., 671 (Mal.), 1129 (Reports, etc.)
—— & Garnham, P. C. C., 603 (R.F.)
——, with ——, Davies & Timms, 86 (R.F.)
Hemphill, F. M., with Eskey, 990 (Typh.)
——, with McDaniel, 856 (Mal.)
Henderson, J. M., 871 (Mal.)
Henrard, C., with Fain, 967 (Mal.)
——, with van Hoof & Peel, 412, 503 (Tryp.)
——, with ——, —— & Wanson, 456 (Hel.)
Henry, A. F. X., (578), 756 (Mal.)
Henry, A. J., 775 (Leish.)
Heredia, R. L., with Alberto Alvarado, 299 (Mal.)
Herivaux, A. & Toumanoff, C., 596 (Pl.)
——, with ——, 995 (Pl.)
Hermans, A. G. J., 1102 (Hel.)
Hernández Cañero, A., (632) (Def. Dis.)
Hernández Lira, J. P., 262 (Hel.)
Hernandez-Morales, F., with Culbertson, Rose, Oliver-González, Figueroa Ortiz, Ruiz Reyes & Nettel, 101 (Hel.)
Hernberg, C. A., 143, 236, 302 (Mal.)
Herrera, G. & Pardo, V., 253 (Y.F.)
Herrlich, A. & Liebmann, H., 1088 (Am.)
Hertig, M. & Fairchild, G. B., 884 (Leish.)
Hesse, E., (784) (Typh.)
Hewitt, R., with Mazzotti, 532 (Hel.)
Hewitt, R. I., Kushner, S., Stewart, H. W., White, E., Wallace, W. S. & SubbaRow, Y., 455 (Hel.)
——, with Oliver-González, 533 (Hel.)
——, with Santiago-Stevenson & Oliver-González, 353 (Hel.)
——, Wallace, W. S., White, E. & SubbaRow, Y., 454 (Hel.)
——, White, E., Wallace, W. S., Stewart, H. W., Kushner, S. & SubbaRow, Y., 455 (Hel.)
Hewlett, P. S. & Parkin, E. A., 122 (Ent.)
Hickman, M. L. M., with Faust, Lewis, Heilbrunn & Everritt, 902 (Am.)
Higgins, J. R., with Mellinkoff, 396 (Mal.)
Hill, I. G. W., with Sayers, 593 (Typh.)
Hill, K. R., 874 (Tryp.)
Hill, M. A., 117 (Ent.)
—— & Roberts, E. W., 118 (Ent.)
Hilmy, I. S., with Khalil Bey, (349) (Hel.)
Hine, C. H., with Harned, Cunningham, Halliday, Vessey, Yuda, Clark, Cosgrove & SubbaRow, 628 (Hel.)
Hinman, E. H., (582) (Mal.)
——, with Bishop, 759 (Mal.)
—— & Cutkomp, L. K., 156 (Mal.)
Hirsch, W., (236) (Mal.)
——, with Sternfeld, 273 (Ulc.)
Hirszfeld, L., 697 (Typh.)
Hirvonen, M., 258 (Am.), 260, 450 (Hel.), 776 (Typh.)
Ho, E. A., Soong, T. H. & Li, Y., 694 (Leish.)
Ho, T. T., 459 (Def Dis.)
Hoare, C. A., 76 (Am.), 504 (Tryp.)
——, with Goodwin & Sharp, 521 (Am.)
Hobson, A. D., 625 (Hel.)
Hocking, K. S., 72 (Y.F.)
Hodges, E. P., with Hunter, Jahnes, Diamond & Ingalls, 623 (Hel.)
——, with Jahnes, 623 (Hel.)
Hoecker, G., with Neghme, Faiguenbaum, Pizzi, Roman, Donoso, Brncic, Agosin, Christen, Sotomayor, Silva & Vilches, 356 (Hel.)
Hoekenga, M. T., 171 (Pl.)
——, with Elmendorf, Barnhill & Takos, 1064 (Mal.)
Hoggarth, E., with Basford, Curd & Rose, (148) (Mal.)
Holcomb, W. F., with Burckhalter, Tendick, Jones, Jones & Rawlins, (682) (Mal.)
Holland, O. L., with Fitzhugh & Nelson, 973 (Mal.)
Hollins, C., 312, 502 (Tryp.)
—— & Lewis-Faning, E., 1070 (Tryp.)

Holmes, E. G. & Trowell, H. C., 726 (Def. Dis.)
Hoobler, S. W., 238 (Mal.)
Hood, M., 262 (Hel.)
van Hoof, L., Henrard, C. & Peel, E., 412, 503 (Tryp.)
——, ——, —— & Wanson, M., 456 (Hel.)
van Hoof, M. T., with Rodhain, (907) (Am.)
d'Hooghe, M., with Jadin, 508 (Typh.)
Hopkins, G. H. E., 255, 995 (Pl.)
Hopkins, J. P., with Weathersbee & Arnold, 1063 (Mal.)
Hoppe, J. O. & Chapman, C. W., 505 (Tryp.)
Höring, R. O., 28 (Mal.)
Hornby, H. E., 1068 (Tryp.)
Horton, R. G., Karel, L. & Chadwick, L. E., 593 (Typh.)
Hortopanu, D., 167, 698 (Typh.)
Horvath, S. M., with Nelson, Eichna, Shelley & Hatch, 731 (Heat Str.)
——, with ——, Shelley, Eichna & Hatch, 732 (Heat Str.)
Hottle, G. A., with Huebner & Robinson, 594 (Typh.)
—— & Shepard, C. C., 248 (Typh.)
Hou, T. C., with Chang, 882 (Leish.)
Houdemer, E., with Chambost, (274) (Ent.)
Houssiau, F. & Cloetens, W., (788) (Am.)
Howell, A., Jr., 643 (Der.)
——, with Cross, 643 (Der.)
——, with Tenenberg, 644 (Der.)
Hoyem, H. M., with Bozicevich, 916 (Hel.)
Hu, S. M. K., 1022 (Hel.)
Huang, C. H., Huang, C. Y., Chu, L. W. & Huang, T. F., 996 (Pl.)
Huang, C. Y., with Huang, Chu & Huang, 996 (Pl.)
Huang, K. C., with Jang, Fu & Wang, 578 (Mal.)
Huang, K. W. & Mao, Y. C., 75 (Chl.)
Huang, T. F., with Huang, Huang & Chu, 996 (Pl.)
Huard, P., with Galliard & Ngu, 1101 (Hel.)
Hubbard, C. A., 827 (B.R.)
Hudson, J. H., (759) (Mal.)
Huebner, R. J., Hottle, G. A. & Robinson, E. B., 594 (Typh.)
——, Jellison, W. L., Beck, M. D., Parker, R. R. & Shepard, C. C., 509 (Typh.)
——, with Shepard, 992 (Typh.)
Huff, C. G., (482) (Mal.)
—— & Coulston, F., 762 (Mal.)
Hugenholtz, M. J., with Hartz & van der Sar, 200 (Hel.)
Hughes, T. P. & Perlowagora, A., 510 (Y.F.)
Hulshoff, A. A., 736 (Reports, etc.), (1004) (Am.)
Hummel, M. S., with Jones, 919 (Hel.)
Humphreys, D. D., with Elderfield, Kreysa & Dunn, (491) (Mal.)
Hunninen, A. V., with Carroll, 624 (Hel.)
Hunt, R., with Hawking, 494 (Mal.)
Hunt, W. E., Abramson, W. & Weaver, T. A., Jr., 624 (Hel.)
Hunter, G. W., Bennett, H. J., Ingalls, J. W., Jr. & Greene, E., 349 (Hel.)
——, Hodges, E. P., Jahnes, W. G., Diamond, L. S. & Ingalls, J. W., Jr., 623 (Hel.)
Hutchinson, M. P., with Harding, 410 (Tryp.)
Hutchison, W. C., with Dobson & Kermack, (576) (Mal.)
Huysinga, J. K., with Bloem & Wilderink, 201 (Hel.)

I

Ibrahim, M., Sorour, A. & El-Sherif, A., 914 (Hel.)
Ignacio, J. L. & Tiong, J. Q., 612 (Lep.)
Ignacio Chala H., J., 345 (Lep.)
d'Ignazio, C., (858) (Mal.), 888 (Typh.)
Iliescu, G. A., with Ivan, (183) (R.F.)
Incho, H. H. & Deonier, C. C., 371 (Ent.)
In der Beeck, M., (998) (Chl.)
India, 655, 656 (Reports, etc.)
Indian J. Malariology, 757 (Mal.)
Ingalls, J. W., Jr., with Hunter, Bennett & Greene, 349 (Hel.)
——, with ——, Hodges, Jahnes & Diamond, 623 (Hel.)
——, with Wright, McMullen, Bennett & Bauman, 194 (Hel.)
Innes, E. M., 1026 (Sp.)
Innes, J., 33 (Mal.)
Internat. J. Leprosy, (436) (Lep.)
Invernizzi, G., 300 (Mal.)
Ionescu, D., 294 (Rab.)
Ionescu, R., with Constantinescu, 710 (R.F.)
Irons, E. E., 1042 (Reports, etc.)
Irons, J. V., Murphy, J. N., Jr. & Davis, D. E., 780 (Typh.)
Irr, G., 569 (Rab.)
Irvin, E. M., with Irvin, (866) *bis* (Mal.)
Irvin, J. L. & Irvin, E. M., (866) *bis* (Mal.)
Irvine, J. C., (655) (Reports, etc.)
Isa, A. A., with Gohar, 1000 (Chl.)
Ivan, I. M. & Iliescu, G. A., (183) (R.F.)

J

Jackson, C. H. N., 874 (Tryp.)
Jackson, E. B., with Rights & Smadel, 702 (Typh.)
——, with Smadel, 779 (Typh.)
——, with —— & Gauld, 321 (Typh.)
Jacobs, L., 80 (Am.)
Jacomb, R. G., with Douglas & Kermack, (401) (Mal.)
Jacotot, H., 291, 669 (Rab.)
Jackson, E. B., with Smadel, Snyder, Fox & Hamilton, 168 (Typh.)
Jacques, J. J. C., 202 (Def. Dis.)
Jacusiel, F., 330 (Den.)
Jadin, J., 325 (Typh.)
—— & Giroud, P., 592 (Typh.)
——, with ——, 60, 697 (Typh.)
—— & d'Hooghe, M., 508 (Typh.)
Jafar, M., 862 (Mal.)
Jahnes, W. G. & Hodges, E. P., 623 (Hel.)
——, with Hunter, Hodges, Diamond & Ingalls, 623 (Hel.)
Jailer, J. W., Rosenfeld, M. & Shannon, J. A., 575 (Mal.)
——, with Taggart, Earle, Berliner, Welch, Zubrod, Kuhn, Norwood & Shannon, 960 (Mal.)
——, Zubrod, C. G., Rosenfeld, M. & Shannon, J. A., 681 (Mal.)

James, M. T., 1121 (Ent.)
Jang, C. S., Fu, F. Y., Huang, K. C. & Wang, C. Y., 578 (Mal.)
Jansen, G., 95 (Hel.)
Jaqueti, G., with Contreras, 1008 (Lep.)
Jayewickreme, S. H. & Niles, W. J., 548 (Ent.)
Jeanpierre, C., with Launoy, 879 *bis* (Tryp.)
Jeffery, G. & Oliver-Gonzalez, J., (923) (Hel.)
Jellison, W. L., with Huebner, Beck, Parker & Shepard, 509 (Typh.)
Jenkins, D. W., 120 (Ent.)
Jenkins, T. W., 199 (Hel.)
Jepson, W. F., 342 (R.F.)
v. Jettmar, H. M., 274 (Ent.)
Jezierski, A., with Giroud, 777 (Typh.)
Johansen, F. A., 610 (Lep.)
—— & Erickson, P. T., 615 (Lep.)
—— with Fite, Erickson & Gemar, 442 (Lep.)
Johnson, C. G., with Lord, 370 (Ent.)
—— & Walton, W. H., 306 (Mal.)
Johnson, H. A., 309 (Mal.)
—— & Akins, H., 1065 (Mal.)
—— & Goodman, W. L., 45 (Mal.)
Johnston, R. S., with Field & Smith, 577 (Mal.)
Johnstone, H. G., with Anderson, Packer, Young Callison, Hambly, Anderson & Reed, 903 (Am.)
——, with Bostick & Anderson, (338) (Am.)
——, with Miller, Keddie & Bostick, 466 (Der.)
Johnstone, R. D. C., 101 (Hel.)
Jolly, H. R., 642 (Der.)
Jones, B. M., 653 (Ent.)
Jones, E., with Darby, Warden & Kaser, 461 (Sp.)
Jones, E. M., with Burckhalter, Tendick, Jones, Holcomb & Rawlins, (682) (Mal.)
Jones, F. E., with Rees, Reardon, Griffin & Bartgis, 79 (Am.)
Jones, M. F. & Brady, F. J., 916, 918 (Hel.)
——, with Cram & Files, 913 (Hel.)
—— & Hummel, M. S., 919 (Hel.)
——, Newton, W. L., Weibel, S. R., Warren, H. B., Steinle, M. L. & Figgat, W. B., 917 (Hel.)
Jones, P. A., with Burckhalter, Tendick, Jones, Holcomb & Rawlins, (682) (Mal.)
Jones, R., Jr., with Alving, Craige, Pullman, Whorton & Eichelberger, 951 (Mal.)
——, with ——, ——, Whorton, Pullman & Eichelberger, 953 (Mal.)
——, with ——, Eichelberger, Craige, Whorton & Pullman, 956 (Mal.)
——, with ——, Pullman, Craige, Whorton & Eichelberger, 954 (Mal.)
——, Craige, B., Jr., Alving, A. S., Whorton, C. M., Pullman, T. N. & Eichelberger, L., 951 (Mal.)
——, with ——, ——, ——, —— & ——, 139 (Mal.)
——, with ——, Eichelberger, Alving, Pullman & Whorton, 953 (Mal.)
——, with ——, Whorton, Pullman, Alving & Eichelberger, 33 (Mal.)
——, with ——, Craige, Alving, Whorton & Eichelberger, 955 (Mal.)
——, with ——, ——, ——, ——, —— & Rothman, 868 (Mal.)
——, with Pullman, Alving, Whorton, Craige & Eichelberger, 865 (Mal.)
——, with ——, Eichelberger, Alving, Jones, Craige & Whorton, 952 (Mal.)
——, ——, Whorton, C. M., Craige, B., Jr., Alving, A. S. & Eichelberger, L., 955 (Mal.)
——, with Whorton, Kirschbaum, Pullman, Craige, Alving, Eichelberger & Coulston, 139 (Mal.)
——, with ——, Pullman, Kirschbaum, Alving, Craige, Eichelberger & Coulston, 235 (Mal.)
——, with ——, Yount, Alving, Pullman, Craige & Eichelberger, 140 (Mal.)
Jones, W. R., 76 (Am.)
——, with Stewart, 1001 (Am.)
——, with —— & Rogers, 788 (Am.)
Jonquieres, E. D. L., with Fiol, Brusco, Melamed & Firpo, 1011 (Lep.)
Jope, E. M., with Macfarlane, O'Brien, Douglas, Jope, Mole, Amos & Quelch, 358 (Haem.)
Jope, H. M., with King, Gilchrist, Wootton, Donaldson, Sisson, Macfarlane, O'Brien, Peterson & Strangeways, 359 (Haem.)
——, with Macfarlane, O'Brien, Douglas, Jope, Mole, Amos & Quelch, 358 (Haem.)
Josephson, E. S., with Coatney, Cooper, Ruhe, Young & Burgess, 680 (Mal.)
Joslyn, D. A., with Ehrlich, Bartz & Smith, 779 (Typh.)
J. National Malaria Soc., 228, (855), (871) (Mal.)
J. Trop. Med. & Hyg., 145 (Mal.)
Joyner, L. P., with Fulton, 430 (Am.), 775 (Leish.)
Jude, A., with Giroud, 167 (Typh.)
Jukes, T. H. & Stokstad, E. L. R., (538) (Sp.)

K.

Kahlstorf, A., 972 (Mal.)
Kahn, M. C., 213 (Ent.)
Kailin, E. W., Davidson, A. G. & Walzer, M., 452 *bis* (Hel.)
Kalandadze, L. P. & Kaviladze, O. P., 296 (Mal.)
Kalra, S. L., 70, 509 (Typh.), 215 (Reports, etc.)
Kamal, A. M. & Abdel Messih, G., 38 (Mal.)
——, Anwar, M., Abdel Messih, G. & Kolta, Z., 85 (R.F.)
Kane, C. A., with Earle, Bigelow & Zubrod, 962 (Mal.)
Kao, Y. S., with Chou & Fu, 755 (Mal.)
Karamchandi, P. V. & Rao, K. S., 333 (Pl.)
Karel, L., with Horton & Chadwick, 593 (Typh.)
Kartman, A. Y., with Alicata, 533 (Hel.)
Kartman, L., Newcomb, E. H., Campau, E. J. & Morrison, F. D., (571) (Mal.)
Kaser, M. M., with Darby, Jones & Warden, 461 (Sp.)
Katzenellenbogen, I., 55 (Leish.)
Kauer, J. T., (648) (Misc. Dis.)
Kaul, P. M., with Biraud, 426 (Chl.)
Kaviladze, O. P., with Kalandadze, 296 (Mal.)
Kean, B. H. & Grocott, R. G., 470, 650 (Prot.)
——, with Snow & Satulsky, 695 (Leish.)

Keddie, F. M., with Miller, Johnstone & Bostick, 466 (Der.)
Keffer, L., 1133 *ter* (B.R.)
Kelsey, F. E., with Moraczewski, 587 (Tryp.)
Kelsey, W. M. & Harrell, G. T., 1079 (Typh.)
Keneford, J. R., Lourie, E. M., Morley, J. S., Simpson, J. C. E., Williamson, J. & Wright, P. H., 690 (Tryp.)
Kennedy, T. J., Jr., with Berliner & Bigelow, 964 (Mal.)
——, with Earle, Berliner, Taggart, Zubrod, Welch, Bigelow & Shannon, 963 (Mal.)
——, with Zubrod & Shannon, 962 (Mal.)
Kenney, M. & Brackett, S., 240 (Mal.)
Kermack, W. O., with Dobson & Hutchison, (576) (Mal.)
——, with Douglas & Jacomb, (401) (Mal.)
Kerr, R. W., with Reeves, 448 (Hel.)
Kershaw, W. E., with Stewart & O'Meara, 1002 (Am.)
Kervran, P., 182 (R.F.), 445 *bis* (Hel.)
—— & Aretas, R., 207 (Der.)
Kettle, D. S., 967 (Mal.)
—— & Sellick, G., 571 (Mal.)
Khalil, M. & Halawani, A., 527 (Hel.)
Khalil Bey, M., 704, (705) (Chl.)
——, with Gaud & Vaucel, 432 (R.F.)
—— & Hilmy, I. S., (349) (Hel.)
Khan, N., 252 (Typh.)
Khaw, O. K., 92 (Hel.)
Kho Lien Keng, 501 (Bl.)
Khoo, F. Y. & Chiang, H.-S., 625 (Hel.)
Kierland, R. R. & McCreight, W. G., 400 (Mal.)
Kieser, J. A., 526 (Hel.)
Kiker, C. C., with Gartrell, 760 (Mal.)
—— & Morris, P., (306) (Mal.)
——, with Simms, 1061 (Mal.)
Kikuth, W. & Mudrow, L., 47 (Mal.)
Kimmelman, L. J., with Machella & Lewis, 304 (Mal.)
King, E. J., Gilchrist, M., Wootton, I. D. P., Donaldson, R., Sisson, R. B., Macfarlane, R. G., Jope, H. M., O'Brien, J. R. P., Peterson, J. M. & Strangeways, D. H., 359 (Haem.)
——, with Latner & Coxon, 96 (Hel.)
King, H. & Tonkin, I. M., (148) (Mal.)
Kinney, T. D., with Burwell & Finch, 311 (Bl.)
Kirby, H., 117 (Prot.)
Kirby, K. S., with Goodson, Goodwin, Gorvin, Goss, Lock, Neal, Sharp & Solomon, 521 *bis* (Am.)
Kirk, R., 424 (Y.F.), 531 (Hel.)
—— & Lewis, D. J., 163 (Leish.)
——, with —— 163 (Leish).
Kirschbaum, W. R., with Whorton, Pullman, Jones, Alving, Craige, Eichelberger & Coulston, 235 (Mal.)
——, with ——, ——, ——, Craige, Alving, Eichelberger & Coulston, 139 (Mal.)
Kirshbaum, J. D., 523 (Am.)
Kirwan, E. W. O'G., 711 (Lep.)
Kitchen, S. F., with Boyd, 393 (Mal.)
Kivits, M., 573 (Mal.)
Klatskin, G. & Friedman, H., 904 (Am.)
Kleeberg, J. & Birnbaum, D., 486 (Mal.)
Kleine, F. K., 689 (Tryp.)
Knaudt, J. A., with Payne & Palacios, 779 (Typh.)
Knipling, E. F., Bushland, R. C., Babers, F. H., Culpepper, G. H. & Raun, E. S., 815 (Ent.)
Knoppers, A. T., 158 (Mal.)
Knowlton, P., with Berliner, Earle, Taggart, Welch, Zubrod, Atchley & Shannon, 961 (Mal.)
Kobayashi, G., with Tieh, Landauer, Miyagawa & Okayasu, 512 (Pl.)
Kodicek, E., Carpenter, K. J. & Harris, L. J., 104 (Def. Dis.)
Koepke, J. A., with Cole, 421 (Typh.)
Koerber, R., with Boiron, 93 (Hel.)
——, with —— & Carronnier, 603 (R.F.)
Kohls, G. M., (548), (815) (Ent.)
—— & Parker, R. R., 703 (Typh.)
Kolff, W. J., with van Noordwijk, J., 160 (Bl.)
Kolta, Z., with Kamal, Anwar & Abdel Messih, 85 (R.F.)
Koninklijke Vereeniging Indisch Instituut, 573 (Mal.)
Kopaczewski, W., (1010) (Lep.)
Kopanaris, P., 602 (Chl.)
Kopeloff, L. M. & Kopeloff, N., 290 (Rab.)
Kopeloff, N., with Kopeloff, 290 (Rab.)
Koppisch, E. & Wilking, V. N., 709 (Am.)
Koprowski, H. & Cox, H. R., 331 *bis* (Den.)
Kordi, A. H., 901 (Chl.)
Kouri, P., 799 (Hel.)
Korns, R. F. & Zeissig, A., 479 (Rab.)
Koroghiannaki, P., with Livadas, Belios & Valla, 758 (Mal.)
Kossobudzki, S. L., with Fox & da Cunha, 511 (Y.F.)
Kouo, C. C., with Lieou, 745 (Rab.)
de Kouroch, with Basset & Coldefy, (465) (Der.)
Krantz, J. C., Jr. & Evans, W. E., Jr., 52 (Tryp.)
Krause, J. B., with Fletcher, 761 (Mal.)
Kreis, H. A., 617 *bis* (Hel.)
Kreysa, F. J., with Elderfield, Dunn & Humphreys, (491) (Mal.)
Krijgsman, B. J., with Dresden, 653 (Ent.)
Krishnamurthy, C. B., with Aiengar, Naidu & Ranganna, 1105 (Haem.)
Krishnaswami, A. K., with Puri, 154 *bis* (Mal.)
Kubicz, J., 420 (Typh.)
Kucher, S. S., 307 (Mal.)
Kuehl, F. A., Jr., Spencer, C. F. & Folkers, K., (866) (Mal.)
Kuhn, B. H., with Taggart, Earle, Berliner, Welch, Zubrod, Jailer, Norwood & Shannon, 960 (Mal.)
Kuhn, L. R., with Blumenthal, Dutra & Paschal, 337 (Am.)
Kulcsar, D. D., 489 (Mal.)
Kullman, H. J. F. & Golden, H., 518 (Am.)
Kulowski, J. & Stovall, S., (269) (Der.)
Kumm, H. W., with Causey, 1080 (Y.F.)
——, with Waddell, 894 (Y.F.)
Kuntz, R. E., Stirewalt, M. A. & Buchheit, J. R., 621 (Hel.)
Kupka, E. & Nothhacksberger, W., 341 (Am.)
Kurz, E. R. H. & Loud, N. W., (207) (Der.)
Kushner, S., with Hewitt, Stewart, White, Wallace & Subba Row, 455 (Hel.)
—— with ——, White, Wallace, Stewart & Subba Row, 455 (Hel.)

L

Lacaz, C. da S., with de Almeida, Ribeiro, Ashcar & Sampaio, 110 (Der.)
——, Ashcar, H., Costa, O. & Viotti, M. R. 1107 (Der.)
Lackman, D. B., with Eklund & Parker, 71 (Typh.)
Ladell, W. S. S., 271 *bis* (Heat Str.)
Laemmert, H. W., Jr., 894 (Y.F.)
——, with Causey & Hayes, 992 (Y.F.)
Laffargue, P., with Aubry & Portier, 19 (Rab.)
Lagodsky, H., with Launoy, 1071 (Tryp.)
Lahiri, S. C., 754 (Mal.), 1000 (Chl.)
Laird, M., (933) (Ent.)
de Lajudie, P., with Floch, 627 (Hel.)
Lambrichts, G. P., 124, 549 (Reports, etc.)
Lampen, H., 970 (Mal.)
Lamphier, T. A., 542 (Der.)
Lamy, L. & Chevrier, A. M., Mlle., 904 (Am.)
——, with Deschiens, 629 (Hel.)
——, Marchal, G. & Chevrier, A. M., 1006 (Am.)
Lancet, 175 *bis* (Chl.), 536 (Sp.), 614 (Lep.)
Landauer, E., with Tieh, Miyagawa, Kobayashi & Okayasu, 512 (Pl.)
Lane, C., 802 (Hel.)
Lang, A. A., with Martinez-Villafañe, 1095 (Hel.)
de Lange, C., 368 (Prot.)
Langeron, M., 111 (Der.)
Lantin, P. T., Gamboa, E. L. & Geronimo, A., (509) (Typh.)
de Laoso, O., with León Blanco, 641 (Der.)
Lapeyssonnie, L., (1101) (Hel.)
Lara, C. B., (437) (Lep.)
Lara, H., Gan, T. M., Matias, M. Y. & Reyes, A. C., 351 (Hel.)
Larabi, M., with Schneider & Balti, 868 (Mal.)
Laranja, F. S., Dias, E. & Nobrega, G., 589 (Tryp.)
——, with —— & ——, (881) (Tryp.)
Larson, A., with Meyer & Quan, 997 (Pl.)
——, with Quan, Foster & Meyer, 597 (Pl.)
Larsh, J. E., Jr., 98 (Hel.)
Laser, H., 583 (Bl.)
Lasnier, E. P., Ardao, H. A. & Cassinelli, J. F., (98) (Hel.)
Latner, A. L., Coxon, R. V. & King, E. J., 96 (Hel.)
Launoy, L., 1071 (Tryp.)
—— & Chaboud, G., Mlle., 879 (Tryp.)
—— & Jeanpierre, C., 879 *bis* (Tryp.)
—— & Lagodsky, H., 1071 (Tryp.)
Lauterburg-Bonjour, M., 393 (Mal.)
Lavietes, P. H., with Most, 317 (Leish.)
Lavoipierre, R., with Tonking & Courtois, 241 (Mal.)
Lawton, A. H., with Ness, Brady & Cowie, 447 (Hel.)
Lebied, B., with Wanson & Wolfs, 392 (Mal.)
Lebon, J., Maire, R., Duboucher, G. & Claude, R., (83) (Am.)
Lee, D. H. K. & Macpherson, R. K., 1114 (Heat Str.)
Lefrou, G., 981 (Bl.)
Le Gac, P., 253 (Den.), 921 (Hel.)
——, with Giroud, 1076 (Typh.)
Leite, A. S., da Luz, J. V. B. & de Meira, M. T. V., 1129 (Reports, etc.)
Lemierre, A., *et al.*, 827 (B.R.)
Lemke, R., 62 (Typh.)
Lendrum, A. C., with Fisher & Fisher, 545 (Misc. Dis.)
Lengauer, L., 608 (Lep.)
Lengrand, J., (891) (Typh.)
Léon, A. P., with Smadel, Ley & Varela, 1077 (Typh.)
León Blanco, F. & de Laosa, O., 641 (Der.)
Leonardon, H., with Benhamou & Albou, 340 (Am.)
Lépine, P. & Athanasiu, P., 289, 291 (Rab.)
——, Levaditi, J. C. & Sautter, V., 329 (Y.F.)
Leprosy in India, 790 (Lep.)
Leprosy Review, 610 (Lep.)
Levaditi, C. & Vaisman, A., 182 (R.F.)
——, —— & Dunoyer, M., 290 (Rab.)
Levaditi, J. C., with Lépine & Sautter, 329 (Y.F.)
Le-Van-Phung, with Toumanoff, 354 (Hel.)
Levavasseur, G., with Sautet, Audouin & Vuillet, 45 (Mal.)
——, with Vuillet, 857 (Mal.)
Levi Castillo, R., 703 (Y.F.)
Levine, A. S., with Bianco, Saunders & Cohn, 28 (Mal.)
Levine, S. A., with Warthin & Evans, 753 (Mal.)
Levy, M. D., Jr. & Yiengst, M. J., (319) (Leish.)
Lewert, R. M., 582 (Mal.)
Lewi, S., with Paraf, (679) (Mal.)
Lewis, A. A. G., with Harries, Waring & Dowling, 546 (Misc. Dis.)
Lewis, D. J., 968 (Mal.)
——, with Kirk, 163 (Leish.)
Lewis, E. A., with Dick, 328 (Typh.)
Lewis, R., with Faust, Heilbrunn, Hickman & Everritt, 902 (Am.)
Lewis, R. A., with Machella & Kimmelman, 304 (Mal.)
Lewis-Faning, E., with Hollins, 1070 (Tryp.)
Lewthwaite, R., 471 (Reports, etc.)
Ley, H. L., Jr., Smadel, J. E. & Crocker, T. T., 1076 (Typh.)
——, with ——, Léon & Varela, 1077 (Typh.)
Li, Y., with Ho & Soong, 694 (Leish.)
Lichtenstein, E. P., (1037) (Ent.)
Lichtman, J. A., 112 (Ulc.)
Liebmann, H., with Herrlich, 1088 (Am.)
Liebow, A. A., Milliken, N. T. & Hannum, C. A., 908 (Am.)
Lie Kian Joe, 99 (Hel.)
Lieou, Y. C. & Kouo, C. C., 745 (Rab.)
Lima, A. da C. & Hathaway, C. R., 173 (Pl.)
Limbos, P., 583 (Bl.), (734) (Misc. Dis.)
Lin, C. C., with Liu & Chang, 325 (Typh.)
Linduska, J. P. & Morton, F. A., 326 (Typh.)
Ling, C. C., 343 (R.F.)
Link, V. B., 43 (Mal.)
Lippincott, S. W., Ellerbrook, L. D., Rhees, M. & Mason, P., 527 (Hel.)
Lips, M., with Vincke, 979 (Mal.)
Littman, M. L., Wicker, E. H. & Warren, A. S., 1108 (Der.)
Liu, W. T., Chang, F. L. & Lin, C. C., 325 (Typh.)

——, Wang, P.-J. & Chang, H.-C., 1079 (Typh.)
——, with Wang & Fu, 777 (Typh.)
Livadas, G. A., 758 (Mal.)
——, Belios, G. D., Koroghiannaki, P. & Valla, C., 758 (Mal.)
Lock, J. A., with Goodson, Goodwin, Gorvin, Goss, Kirby, Neal, Sharp & Solomon, 521 *bis* (Am.)
Lodens, J. C., with Swellengrebel & Swellengrebel, (470) (Ent.)
Loewenthal, L. J. A., 362 (Der.)
Logan, J. L., 709 (Am.)
Lomax, P. H., 862 (Mal.)
Lombard, F. F., (971) (Mal.)
London, I. M., with Taggart, Earle, Berliner, Zubrod, Welch, Wise, Schroeder & Shannon, 958 (Mal.)
Loomis, T. A., with Drill, 1023 (Def. Dis.)
Lopes, C. F., 87 (Ys.)
Lopez Toca, R., with Spies, Garcia Lopez, Milanes & Culver, 923 (Sp.)
Lord, K. A. & Johnson, C. G., 370 (Ent.)
Loud, N. W., with Kurz (207) (Der.)
Loughlin, E. H. & Stoll, N. R., 722 (Hel.)
Lourenço Marques, 584 (Tryp.)
Lourie, E. M., with Keneford, Morley, Simpson, Williamson & Wright, 690 (Tryp.)
——, with Williamson, 48 (Mal.), 413 (Tryp.)
Loveridge, F. G., Ross, W. F. & Blair, D. M., 716 (Hel.)
Lovett-Campbell, A. C., 649 (Misc. Dis.), 723, 793 (Hel.)
Lozano, A. with Clavero & Romeo Viamonte, 238 (Mal.)
Lozano, A. A., with Gutierrez & Pesigan, 259 (Hel.)
Lozano Morales, A., with Luengo Arroyo & Nájera Angulo, 163 (Leish.)
Lubitz, J. M., 692 (Leish.)
Lübke, A., 988 (Typh.)
de Lucena, D. T., 676 *bis*, 1061 (Mal.)
Lucrezi, G., 486 (Mal.)
Lunego Arroyo, E., Nájera Angulo, L. & Lozano Morales, A., 163 (Leish.)
Lugo, G., with Bettolo, 734 (Misc. Dis.)
Luis Carri, E., 789 (1006) (Am.)
Lumsden, W. H. R., 470 (Ent.)
Luttermoser, G. W., 447 (Hel.)
Lutz, R. E. & Rowlett, R. J., Jr., (682) (Mal.)
da Luz, J. V. B., with Leite & de Meira, 1129 (Reports, etc.)

M.

Macandrew, M. & Davis, E., (357) (Hel.)
MacArthur, W., 711 (Lep.)
McCain, B. E., with Rigdon, 409, 687 (Mal.)
McCarthy, D. D. & Wilson, D. B., 993 (Den.)
MacCarthy, E., 696, (989) (Typh.)
McCauley, R. H., Fay, R. W. & Simmons, S. W., 760 (Mal.)
Macchiavello, A., 109, 641 (Vms.), 1112 (Oph.)
McClenanan, W. E., with Gayton & Bellis, 809 (Hel.)
McCoubrey, A. & Webster, W., (492) (Mal.)
McCoy, G. W., 1007 (Lep.)
MacCreary, D. & Bricker, A. G., 210 (Misc. Dis.)
McCreary, J. H., with Chen, 505 (Tryp.)
McCreight, W. G., with Kierland, 400 (Mal.)
McCulloch, R. N. & Waterhouse, D. F., 869 (Mal.)
McDaniel, G. E., with Faust & Scott, 231 (Mal.)
—— & Hemphill, F. M., 856 (Mal.)
Macdonald, A. B., 1014 (Lep.)
Macdonald, D. R., 237 (Mal.)
Macdonald, G., 124 (Reports, etc.), 239, (975) *bis* (Mal.), 502 (Tryp.)
MacDougall, M. S., 26 (Mal.)
McDougall, W. A., 255 (Pl.)
MacFarlane, J. O. & Ruchman, I., 1035 (Prot.)
Macfarlane, R. G., with King, Gilchrist, Wootton, Donaldson, Sisson, Jope, O'Brien, Peterson & Strangeways, 359 (Haem.)
—— & O'Brien, J. R. P., with Douglas, C. G., Jope, E. M., Jope, H. M., Mole, R. H., Amos, B. & Quelch, P., 358 (Haem.)
Macfie, J. W. S., 933 (Ent.)
MacGibbon, C. B., with Findlay & Boulter, 206 (Haem.)
McGill, R. G., (199) (Hel.)
McGinty, D. A., with Thompson, Bush & Wilson, 1066 (Mal.)
Machado, A. C., with de Albuquerque, 115 (Misc. Dis.)
Machella, T. E., Kimmelman, L. J. & Lewis, R. A., 304 (Mal.)
Maciel, P. & Rosenfeld, G., (55) (Leish.)
Mackay-Dick, J., (788) (Am.)
Mac Keith, R. & Watson, J. M., (629) (Hel.)
Mackenzie, M., 57 (Typh.)
Mackerras, I. M., 651 (Ent.)
Mackerras, M. J. & Ercole, Q. N., 305 (Mal.)
—— & Roberts, F. H. S, 572 (Mal.)
McLaughlin, F. W., 467 (Der.)
McLendon, P. A., with Tichenor & Ross, 326 (Typh.)
McLendon, S. B., with Coatney, Cooper & Young, 150 (Mal.)
McLeod, C., with Turner & Updyke, 89 (Ys.)
McLetchie, J. L., 502 (Tryp.)
McMullen, D. B. & Brackett, S., 920 (Hel.)
——, with Wright, Bennett, Bauman & Ingalls, 194 (Hel.)
Macnamara, O. D., 533 (Def. Dis.)
Macpherson, R. K., with Lee, 1114 (Heat Str.)
McSweeney, J. E. J., Mermann, A. C. & Wagley, P. F., 267 (Haem.)
Maegraith, B. G., (973), 1054 (Mal.), (981) (Bl.)
——, with Andrews, 678 (Mal.)
——, with —— & Gall, 234, 491 (Mal.)
de Magalhães, O., 109, 1106 (Vms.)
—— & Rocha, A., 618 (Hel.), (777) (Typh.)
——, —— & Rodrigues, I., (777) (Typh.)
Magalhães Carvalho, 635 (Def. Dis.)
——, Pinto, A. G., Schmidt, M. M., Potsch, N. & Costa, N., 635 (Def. Dis.)
——, Schmidt, M. M. & Pinto, A. G., 728 (Def. Dis.)
de Magalhaes Carvalho, J., 635 (Def. Dis.)
Magath, T. B., with O'Neal, 802 (Hel.)
Mahaffy, A. F., (1080) (Y.F.)
Maier, J., 754, 867, 971 (Mal.)
——, Bang, F. B. & Hairston, N. G., 860 (Mal.)
——, with ——, —— & Roberts, 45 (Mal.)

——, with Hairston & Bang, 22 (Mal.)
Maire, R., with Lebon, Duboucher & Claude, (83) (Am.)
Makari, J. G., 394, 395 (Mal.)
Makar Bey, N., 795 (Hel.)
Makkawi, M., with Gohar, 705 *bis*, 706 (Chl.)
——, with ——, Elyan, Eissa & Bashatly, 897 (Chl.)
Malamos, B., with Shortt & Garnham, 388 (Mal.)
Malaya, 471 (Reports, etc.)
Maldonado, J. F. & Acosta Matienzo, J., 192 *bis* (Hel.)
Malisoff, W. M., (692) (Tryp.)
Mallik, K. N. B., with Sen Gupta & Chakravarty, 882 (Leish.)
Malta, 784 (Pl.)
Mamou, H. 237 (Mal.)
Mañalac-Morales, S., with Tupas, 627 (Hel.)
Manalang, C., (610), 611 *bis* (Lep.)
Mandoul, R. & Pautrizel, R., 800 (Hel.)
Mangabeira-Albernaz, P., 321 (Leish).
Mangeon, G., with Mendes, (438) (Lep.)
Mani, 74 (Pl.)
Mann, E. R., with Nolan & Churchill, 919 (Hel.)
Manson-Bahr, P., 76, 83, 519 (Am.), 101 (Hel.), 374 *bis*, 820 (Reports, etc.), 502 (Tryp), 711 (Lep.)
—— & Muggleton, W. J., 429 (Am.)
Manson-Bahr, P. E. C., with Charters, 546 (Misc. Dis.)
Manwell, R. D. & Feigelson, P., 1124 (Lab.)
Mao, Y. C., with Huang, 75 (Chl.)
Mara, L., (968) (Mal.)
Marchal, G., with Lamy & Chevrier, 1006 (Am.)
Marco Ahuir, R., with Sanchis Bayarri & Selfa, (694) (Leish.)
Mardare, I., with Zotta, Radacovici, Teodorescu, Georgescu, Duport, Atanasiu & Trifon, 133 (Mal.)
Maren, T. H., with Otto & Brown, 353 (Hel.)
Mariani, M., with Buonomini, 673 (Mal.)
Marie-Suzanne, (610) (Lep.)
Marill, F. G., 798 (Hel.)
Mariotti, M., (595) (Den.)
Marks, E. N., 370 *bis* (Ent.)
Marqvard, H., 539 (Vms.)
Marriott, H. L., 208 (Heat Str.)
Marshall, P. B., 49, 495 *bis* (Mal.)
Martinez Dominguez, V., (911) (Lep.)
Martinez-Villafañe, H. & Lang, A. A., 1095 (Hel.)
Martini, E., 376 (B.R.)
Maryon, M., with Shute, 578, 751 (Mal.)
Mascati, N. T., 1111 (Oph.)
Masih, M., (715) (Lep.)
Mason, P., with Lippincott, Ellerbrook & Rhees, 527 (Hel.)
Massias, C., 1056 (Mal.)
Mateo Alonso, A., 29 (Mal.)
Mather, A. N., with Burrows, Elliott & Havens, 178 (Chl.)
Matheson, R., with Vargas, (1053) (Mal.)
Mathieu, M., 22 (Mal.)
Matias, M. Y., with Lara, Gan & Reyes, 351 (Hel.)
Mattingly, P. F., 137 (Mal.)
Maurice, A., with Gaud, 912 (Hel.)
Mauzé, J., 390 (Mal.)
May, K. H., with Frank, 988 (Typh.)
Mayer, M., Pifano C., F. & Medina, R., (54) (Tryp.)
——, with ——, —— & Benaim Pinto, 1072 (Tryp.)
Mayhew, R. L., 366 (Misc. Dis.)
Maynard, R., with Sandground, 585 (Tryp.)
Mazzotti, L., 163 (Tryp.), 922, (1102) (Hel.)
—— & Hewitt, R., 532 (Hel.)
——, Rodriguez, L. & Treviño, A., 261 (Hel.)
——, with Varela, 251 (Typh.)
Mead, P. A., with Putnam & Boyd, 488 (Mal.)
Méchali, D., with Schneider, 865 (Mal.)
Medina, H., with Muniz, 776 (Leish.)
Medina, R., with Mayer & Pifano, (54) (Tryp.)
——, with Pifano, Mayer & Benaim Pinto, 1072 (Tryp.)
van Meerbeeck, P. E. & Docq, M., 1062 (Mal.)
Meeser, C. V., with Gorman, Ross & Blair, 258 (Hel.)
——, Ross, W. F. & Blair, D. M., 794 (Hel.)
Mégroz, R. L., (937) (Reports, etc.)
de Meillon, B., 190, (715) (Hel.), 295 (Mal.), 1037 (Ent.)
——, & Gear, J., 119 (Ent.)
——, with Golberg, (149) (Mal.)
——, with Thorp, (275) (Ent.)
—— & Thorp, J. M., 149 (Mal.), (275) (Ent.)
——, —— & Hardy, F., 789 (R.F.)
Meira, C., (237) (Mal.)
Meira, J. A., 346 (Hel.)
de Meira, M. T. V., with Leite & da Luz, 1129 (Reports, etc.)
——, Nogueira, J. F. P. & Simões, T. S., 1092 (Hel.), 1130 (Reports, etc.)
——, Simões, T. S. & Nogueira, J. F. P., 1031 (Der.) 1122 (Ent.)
Melamed, A. J., with Fiol, Jonquieres, Brusco & Firpo, 1011 (Lep.)
Meleney, H. E., with Yolles, Moore, DeGiusti & Ripsom, 349 (Hel.)
—— & Zuckerman, L. K., 786 (Am.)
Mellinkoff, S. M. & Higgins, J. R., 396 (Mal.)
de Mello, J. M. F., 789 (Am.)
de Mello, R. P., with Cruz, 494 (Mal.)
Melnick, J. L., Curnen, F. C. & Sabin, A. B., 1082 (Den.)
—— & Paul, J. R., 895 (Den.)
——, with —— & Sabin, 1081 (Den.)
Mendes, P. & Mangeon, G., (438) (Lep.)
Méndez Lemaitre, A., with Restrepo, (340) (Am.)
Mendoza, J. T., 542 (Der.)
Menon, I. G. K., with Ahuja & Veeraraghavan, 361 (Vms.)
Menon, M. K., with Afridi, Ramakrishnan & Goswami, 239 (Mal.)
Mercau, R., with Fernandez, 611 (Lep.)
Merchant, S. M., with Savoor & Das Menon, 781 (Typh.)
Merle, with Crosnier, Bernier, Molinier & Tabusse, 1086 (Am.)
Mermann, A. C., with McSweeney & Wagley, 267 (Haem.)
de Mesquita, A. P., 616 (Lep.)
Mesquita, S. S., with Pelegrino, 506 (Tryp.)

Meyer, H., with Guimarães, 368 (Prot.)
—— & Xavier de Oliveira, M., 983 (Tryp.)
Meyer, K. F., (1131) (Reports, etc.)
—— & Foster, L. E., 896 (Pl.)
——, with Quan, Foster & Larson, 597 (Pl.)
——, —— & Larson, A., 997 (Pl.)
Meyers, F. M., 174 (Pl.)
Micks, D. W., 497 (Mal.)
Milanes, F., with Spies, Garcia Lopez, Lopez Toca & Culver, 923 (Sp.)
——, with ——, ——, Stone, Brandenburg & Aramburu, 460 (Sp.)
——, with ——, ——, ——, Lopez Toca & Aramburu, 462 (Haem.)
Milani-Comparetti, P., with Castana, 755 (Mal.)
Miller, A., Burgess, R. W. & Carpenter, S. J., 485 (Mal.)
Miller, A. A. & Peck, C. R., 523 (Am.)
Miller, D. & Fleming, J., (1100) (Hel.)
Miller, H. E., Keddie, F. M., Johnstone, H. G. & Bostick, W. L., 466 (Der.)
Miller, J. K., with Tompkins, 84 (Am.)
Miller, J. M. & Thomison, S. J., 469 (Misc. Dis.)
Miller, M. J. & Choquette, L. P. E., 1083 (Am.)
Miller, M. S., with Florio, 512 (Den.)
Milliken, N. T., with Liebow & Hannum, 908 (Am.)
Millman, N., with Singher & Bosworth, 682 (Mal.)
Millot, J., with Colas-Belcour, (1122) (Ent.)
Milne, J. C., 1118 (Misc. Dis.)
Milne, J. J. C., 1063 (Mal.)
Minnich, V. S., with Wisecup & White, 548 (Ent.)
Minning, W., with Vogel, 196 (Hel.)
Missiroli, A., 151 (Mal.)
Mitchell, J. P., 552 (B.R.)
Miterstein, B., with Sagher, 647 (Oph.)
Mitra, K. & Rao, K. K. P. N., 206 (Ep. Drop.)
Miyagawa, F., with Tieh, Landauer, Kobayashi & Okayasu, 512 (Pl.)
Moffatt, J. S., with Cuthbertson, (866) (Mal.)
Mofidi, C., with Baltazard & Bahmanyar, 434 (R.F.)
Mohapatra, G. S., 907 (Am.)
Moiser, B., 91 (Lep.)
Mole, R. H. & Everard, A., 538 (Vms.)
——, with Macfarlane, O'Brien, Douglas, Jope, Jope, Amos & Quelch, 358 (Haem.)
Molinier, with Crosnier, Merele, Bernier & Tabusse, 1086 (Am.)
Monaci, V., 747 (Mal.)
Mondini, E. M., (418) (Leish.)
Monk, J. F., 576, 577, 1058 (Mal.)
Monnerot-Dumaine, M. & Sananes, N., (30) (Mal.)
Montel, M. L. R., (1091) (Lep.)
Montestruc, E. & Caubet, P., (189), 345 (Lep.)
—— & Ragusin, 345 (Lep.)
——, Ragusin, E. & Caubet, P., 259 (Hel.)
Montezin, G., with Bovet, Decourt & Schneider, (873) (Mal.)
Montgomery, T. H. L. & Budden, F. H., 322, 324 (Typh.)
Monthly Bull. Ministry of Health & Pub. Health Lab. Service, (174), 336 (Chl.)
Montoya, J. A. & Osejo, P. P., 989 (Typh.)
——, —— & Topping, N. H., 419 (Typh.)
Mooney, R. D., with Wallace & Sanders, 722 (Hel.)
Moore, D. V., with Yolles, DeGiusti, Ripson & Meleney, 349 (Hel.)
Mooser, H., (213) (Ent.)
Moraczewski, S. A. & Kelsey, F. E., 587 (Tryp.)
de Moraes, R. G., 801 (Hel.)
Morales, P., with Guzman, (264) (Hel.)
Morel, P., with Revol & Coudert, 590 (Typh.)
Morenas, L., 94 (Hel.)
Morey Sotomayor, G., 351 (Hel.)
Morgan, H. R., Neva, F. A., Fahey, R. J. & Finland, M., 887 (Typh.)
Morgan, M. T., with Gaud, 431 (R.F.)
Morgenstern, P., with Study, 814 (Der.)
Morkos, F., with Halawani & Baz, 681 (Mal.)
Morley, J. S., with Keneford, Lourie, Simpson, Williamson & Wright, 690 (Tryp.)
Morris, P., with Kiker, 306 (Mal.)
Morris, R. M., 122 (Reports, etc.)
Morrison, F. D., with Kartman, Newcomb & Campau, (571) (Mal.)
Morton, F. A., with Linduska, 326 (Typh.)
——, with Snyder, 252 (Typh.)
Morton, T. C., 76 (Am.)
—— & Soutar, S. F., 257 (Am.)
Mosna, E., 136 (Mal.)
Mosquito Control, 547 (Ent.)
Most, H. & Lavietes, P. H., 317 (Leish.)
Motta, L. da C., 1107 (Der.)
Motta-Diana, A., with Buonomini, 399 (Mal.)
Moulder, J. W., (1074) *bis* (Tryp.)
Moura, F. P., with Braga, Penido, Bassères, Pinto & Bezerra, 408 (Mal.)
——, with Penido, Azevedo, Pinto, Bezerra & de Sousa, 408 (Mal.)
Moyer, A. W., with Wharton & Cuervo, 808 (Hel.)
Mudrow, L., with Kikuth, 47 (Mal.)
Muesebeck, C. F. W., 547 (Ent.)
Muggleton, W. J., with Manson-Bahr, 429 (Am.)
Muir, E., 711 (Lep.), 1131 (B.R.)
Mukasa, S. B. K., with Snell, (1100) (Hel.)
Mukherjee, N. N., 909 (Am.)
Mullick, K. B. & Gupta, J. C., 755 (Mal.)
Mulligan, H. W. & Sommerville, T., 495 (Mal.)
Muniz, J., 54 (Tryp.)
—— & de Azevedo, A. P., 416 (Tryp.)
—— & Medina, H., 776 (Leish.)
——, Nobrega, C. & da Cunha, M., 55 (Tryp.)
——, with Torres, Cardoso & Duarte, 776 (Leish.)
Murano, G., 418, (419) (Leish.)
Murgatroyd, F., 76 (Am.)
Murphy, J. N., Jr., with Irons & Davis, 780 (Typh.)
Murray, W. D., 807 (Hel.)

N

Nabarro, J. D. N., (930) (Der.)
Nagendra, S., 41 (Mal.)
Naidu, B. R. L., with Aiengar, Krishnamurthy & Ranganna, 1105 (Haem.)
Nair, C. P., 677, 1063 (Mal.)
Nájera Angulo, L., with Luengo Arroyo & Lozano Morales, 163 (Leish.)

Naji, K., (1101) (Hel.)
Napier, L. E., 76, 79 (Am.), 101 (Hel.), 247 (Leish.)
Nascimbene, A. & Prezioso, A., 22 (Mal.)
Nash, T. A. M., 245, 689, 983 (Tryp.)
Nasr, L. A., 604 (R.F.)
Nature, 52 (Tryp.)
Nauck, E. G., with Enigk, K., Vogel, J., Reichenow, E. Westphal, A. & Weyer, F., 1137 (B.R.)
Neal, R. A., 1083 (Am.)
——, with Goodson, Goodwin, Gorvin, Goss, Kirby, Lock, Sharp & Solomon, 521 *bis* (Am.)
Nederl. Tijdschr. v. Geneesk, 736, 1041 (Reports, etc.)
Neel, J. V., with Valentine, 927 (Haem.)
Negherbon, W. O., with Shi Lu Chang, 590 (Leish.)
Neghme, A., Faiguenbaum, J., Pizzi, T., Roman, J., Donoso, R., Hoecker, G., Brncic, D., Agosin, M., Christen, R., Sotomayor, D., R., Silva C., R. & Vilches R. 356 (Hel.)
Neghme Rodríguez A., 594 (Y.F.)
de Negri, U., 747 (Mal.)
——, with Barasciutti, 1057 (Mal.)
Negroni, P., Fernández, L. L. & Daglio, C. A. N., 110 (Der.)
—— & Radice, J. C., (1031) (Der.)
Nelis, P., 250 (Typh.)
Nelson, A. A., with Fitzhugh & Holland, 973 (Mal.)
Nelson, E. C., 179 (Am.)
Nelson, M. G., 30 (Mal.)
Nelson, N., Eichna, L. W., Horvath, S. M., Shelley, W. B. & Hatch, T. F., 731 (Heat Str.)
——, Shelley, W. B., Horvath, S. M., Eichna, L. W. & Hatch, T. F., 732 (Heat Str.)
Neri, I., 933 (Ent.)
Ness, A. T., Brady, F. J., Cowie, D. B. & Lawton, A. H., 447 (Hel.)
Nettel, R., with Culbertson, Rose, Hernandez-Morales, Oliver-Gonzalez, Figueroa Ortiz & Ruiz Reyes, 101 (Hel.)
Neva, F. A., with Morgan, Fahey & Finland, 887 (Typh.)
Newbold, C. E. & Cochrane, E., 307 (Mal.)
Newcomb, E. H., with Kartman, Campau & Morrison, (571) (Mal.)
Newport, N. M., 237 (Mal.)
Newsome, J., with Halawani & Wootton, 721 (Hel.)
Newton, W. L., with Jones, Weibel, Warren, Steinle & Figgat, 917 (Hel.)
New Zealand, 472 (Reports, etc.)
Ngu, D. V., with Galliard, 259 (Hel.)
——, with —— & Huard, 1101 (Hel.)
Nguyen Van Huong, with Toumanoff, 355 (Hel.)
Nicholls, L., 204 (Def. Dis.)
Nicholson, H. P. & Gaines, T. B., 598 (Pl.)
Nieto Caicedo, M., 24 (Mal.)
Nigeria, (161) (Tryp.)
Niles, J. O. & Bourne, G. C., 782 (Typh.)
Niles, W. J., with Jayewickreme, 548 (Ent.)
Noble, B. R., 354 (Hel.)
Noble, E. R., (709) (Am.)
Nobrega, G., with Dias & Laranja, (881) (Tryp.)
——, with Laranja & Dias, 589 (Tryp.)
——, with Muniz & da Cunha, 55 (Tryp.)
Nodenot, L., 161 (Tryp.)
Nogueira, J. F. P., with de Meira & Simões, 1031 (Der.), 1092 (Hel.), 1122 (Ent.), 1130 (Reports, etc.)
Nolan, M. O., Mann, E. R. & Churchill, H. M., 919 (Hel.)
Nolasco, J. O., 613 (Lep.)
van Noordwijk, J., with Kolff, 160 (Bl.)
Nor El-Din, G., with Halawani, Watson, Hafez & Dawood, 797 (Hel.)
Norwood, J., with Taggart, Earle, Berliner, Welch, Zubrod, Jailer, Kuhn & Shannon, 960 (Mal.)
Nothhacksberger, W., with Kupka, 341 (Am.)
Nottingham, E., with Deonier & Fluno, 581 (Mal.)
Noury, M., 606 (R.F.), 889 (Typh.)
Novicky, R., (295) (Rab.)
Noya Benitez, J., 619 (Hel.)
Noyan, A., 855 (Mal.)
Nyka, W., 325 (Typh.)

O.

Obermayer, M. E., 188 (Lep.)
O'Brien, J. P., 361 (Der.)
O'Brien, J. R. P., with King, Gilchrist, Wootton, Donaldson, Sisson, Macfarlane, Jope, Peterson & Strangeways, 359 (Haem.)
——, with ——, Douglas, Jope, Jope, Mole, Amos & Quelch, 358 (Haem.)
O'Connor, R. J., 76 (Am.)
Oelrichs, L., with Bieling, 886 892, 893, *bis*, (Typh.)
Oey Oen Bie, 1020 (Hel.)
Okayasu, G., with Tieh, Landauer, Miyagawa & Kobayashi, 512 (Pl.)
Okulov, W., 373 (Ent.)
Oldroyd, H., (119) (Ent.)
Oliver-Gonzalez, J., with Culbertson, Rose, Hernandez-Morales, Figueroa Ortiz, Ruiz Reyes & Nettel, 101 (Hel.)
—— & Hewitt, R. I., 533 (Hel.)
Oliver-Gonzalez, J., with Jeffery, (923) (Hel.)
——, with Santiago-Stevenson & Hewitt, 353 (Hel.)
de Oliveira, J. L., with Pondé & others, 314 (Tryp.)
Olmos Castro, N., Arcuri, P. B. & Bonatti, A. A., 1010 (Lep.)
Olsen, R. E., with Porritt, 441 (Lep.)
Olson, B. J., with Emmons & Bell, 207 (Der.)
Omar, A. A., with Halawani, 707 (Chl.)
Omar, M. El S., (183), 183 (R.F.)
O'Meara, P. J., with Stewart & Kershaw, 1003 (Am.)
O'Neal, R. & Magath, T. B., 802 (Hel.)
Ordway, N. K., with Harrison, Bunting & Albrink, 498 (Bl.)
Orlandi, A., 530 (Hel.)
Orlandi, M. A. R., with Celener, (98) (Hel.)
Ortiz Mariotte, C., 1077 (Typh.)
Ortner, E., 735 (Misc. Dis.)
Ortuzar, R., Pozo, S. & Rosati, S., 605 (R.F.)
Osejo, P. P., with Montoya, 989 (Typh.)
——, with —— & Topping, 419 (Typh.)
Osimani, J. J., 1100 (Hel.)

O'Sullivan, P. J., with Roberts, 968 (Mal.)
Otten, L., 568 (Rab.)
Otto, G. F., Maren, T. H. & Brown, H. W., 353 (Hel.)
Ottolina, C., 193, 915 (Hel.)
Overman, R. R. & Feldman, H. A., 766 (Mal.)

P.

Packchanian, A., (790) (R.F.)
Packer, H., 149 (Mal.)
——, with Anderson, Johnstone, Young, Callison, Hambly, Anderson & Reed, 903 (Am.)
Pak, C., 96 (Hel.)
Pal, R., 136 (Mal.)
Palacios, S., with Payne & Knaudt, 779 (Typh.)
Palarca, E., with Del Mundo, Baltazar & Suogang, 531 (Hel.)
Pandit, C. G., with Adiseshan & Venkatraman, 336 (Chl.)
Pantoja, W. P. & Bassères, M. S., 451 (Hel.)
——, with ——, 191 *bis*, (443) (Hel.)
Paraense, W. L., 47, 582 (Mal.)
Paraf, J. & Lewi, S., (679) (Mal.)
Paranjothy, J. T., 860 (Mal.)
Pardo, V., with Herrera, 253 (Y.F.)
Parekh, J. G. & Boghani, B. P., 36, 862 (Mal.)
Paris Pellicer, C., with Sanchis Bayarri & Garcia Martinez, (800) (Hel.)
Parker, B., with Dulaney, Priest & Almeda, 857 (Mal.)
Parker, R. R., with Eklund & Lackman, 71 (Typh.)
——, with Huebner, Jellison, Beck & Shepard, 509 (Typh.)
——, with Kohls, 703 (Typh.)
Parkhill, E. M., with Weed, 813 (Der.)
Parkin, E. A., with Hewlett, 122 (Ent.)
Parkinson, T., 82 (Am.)
Parmer, L. G., 1004 (Am.), 1058 (Mal.)
Parrot, L. & Durand-Delacre, R., (470) (Ent.)
Partelides, G., 327 (Typh.)
Paschal, H., with Blumenthal, Dutra & Kuhn, 337 (Am.)
Paseyro, P., with Piaggio Blanco & Fernández Chapela, (1023) (Hel.)
Pasricha, C. L., Paul, B. M., Das Gupta, A. C. & Das, A. K., 515 *bis*, 601 *bis* (Chl.)
Passmore, R., 202 (Def. Dis.), 1046 (B.R.)
Passos, W. & Barbosa, N. de C., 1100 (Hel.)
Pastor Botija, F., 524 (R.F.)
Patel, J. C., (724) (Hel.)
Paterson, A. R., 124 *bis* (Reports, etc.)
Patkar, N. A., with Row, (317) (Leish.)
Patrissi, T., 673 (Mal.)
Patton, R. L. & Sarkaria, D. S., (936) (Ent.)
Paul, B. M., with Pasricha, Das Gupta & Das, 515 *bis*, 601 *bis* (Chl.)
Paul, J. H. & Bellerive, A., 23 (Mal.)
Paul, J. R., with Melnick, 895 (Den.)
——, —— & Sabin, A. B., 1081 (Den.)
Pautrizel, R., with Mandoul, 800 (Hel.)
——, with Sigalas, (1120) (Misc. Dis.)
Pavlov, P., (56) (Leish.)
Pavlovsky, E. N., 170 (Den.)
Payne, E. H., Knaudt, J. A. & Palacios, S., 779 (Typh.)
Payzin, S., with Erzin, 426 (Pl.)
—— & Golem, S. B., 891 (Typh.)
Pearse, A. S., 216, 1131 (Reports, etc.)
Peck, C. R., with Miller, 523 (Am.)
Pecora, L. J., with Consolazio & Tusing, 112 (Heat Str.)
Peel, E. & Chardome, M., 809 (Hel.)
——, with van Hoof & Henrard, 412, 503 (Tryp.)
——, with ——, —— & Wanson, 456 (Hel.)
Peeney, A. L. P., with Cooke, Frazer, Sammons & Thompson, 535 (Sp.)
Peffly, R. L., Davidson, R. H., & Waters, H. A. (969) (Mal.)
Pellegrino, J., with Furtado, 645 (Der.)
—— & Mesquita, S. S., 506 (Tryp.)
Pellicciotta, R., 570 (Mal.)
Pellissier, A., (312) (Tryp.)
——, with Trinquier, 877 *bis* (Tryp.)
Pellitteri, O., with Greenberg, 71 (Typh.)
Peña Chavarria, A., Sáenz Herrera, C., Cordero, E. & Bolanos, L., 790 (R.F.)
Penido, H. M., 391 (Mal.)
——, with Amaral, 27 (Mal.)
——, Azevedo, N., Pinto, D. B., Bezerra, F., Jr., de Sousa, E. F. & Moura, F. P., 408 (Mal.)
——, with Braga, Bassères, Pinto, Bezerra & Moura, 408 (Mal.)
Pennell, R. B., with Smith, 514 (Chl.)
Peredo Reyes, E., (307) (Mal.)
Pérez, J. C., 104 (Def. Dis.)
Périer, R., with Siguier & Sarrazin, 518 (Am.)
Perk, D., 398 (Mal.)
Perlowagora, A., with Hughes, 510 (Y.F.)
Perry, W. J., 784 (Den.)
Perry, W. L. M., with Hawking & Thurston, 685 (Mal.)
Pervès, M., 1058 (Mal.)
Pesigan, T. P., 622 (Hel.)
——, with Gutierrez & Lozano, 259 (Hel.)
——, Torres, L. F., Jr., & Recio, P. M., (97) (Hel.)
Pessôa, S. B. & Rotberg, A., 696 (Leish.)
Peta, T., 481 (Mal.)
Peterson, J. M., with King, Gilchrist, Wootton, Donaldson, Sisson, Macfarlane, Jope, O'Brien & Strangeways, 359 (Haem.)
Peterson, O. L., with Fox, 592 (Typh.)
Peus, F., 26 (Mal.)
Pfeiffer, A. V., 789 (Am.)
Philip, C. B., 424, 991 (Typh.)
Piaggio Blanco, R. A., Fernández Chapela, A. & Paseyro, P., (1023) (Hel.)
Piccardi, G. & Radaeli, G., 1092 (Lep.)
Pick, F., (800) *bis* (Hel.)
—— & Deschiens, R., 350, (800) (Hel.)
——, with ——, (1065) (Mal.)
Piekarski, G., 1067 (Mal.), 1087 (Am.)
Pifano, C. F., with Mayer & Medina, (54) (Tryp.)
——, ——, —— & Benaim Pinto, H., 1072 (Tryp.)
Piñero García, P. P., 232 (Mal.)
Pinkerton, H., with Greiff, 509 (Typh.)
Pinkerton, J. M., 363 (Ulc.)
Pinotti, M., 232 (Mal.)
——, Rachou, R. G. & Ferreira, M. O., 1053 (Mal.)

Pinto, A. G., with Magalhães Carvalho & Pinto, 728 (Def. Dis.)
——, with ——, Schmidt, Potsch & Costa, 635 (Def. Dis.)
Pinto, A. R., 1070 (Tryp.)
—— & de Almeida, C. L., 1101 (Hel.)
Pinto, C., 53 (Tryp.)
Pinto, D. B., with Braga, Penido, Bassères, Bezerra & Moura, 408 (Mal.)
——, with Penido, Azevedo, Bezerra, de Sousa & Moura, 408 (Mal.)
Pinto, G. de S., (32), 400 (Mal.)
Pinto, M. R., with de Azevedo, J. F. & Cambournac, 966 (Mal.) 1081 (Y.F.)
Pires, C. D. de A., with Amaral & Pontes, 824 (B.R.)
Piringer, W., 1049 (Rab.)
Pisani, T. M., with Freund, Thomson, Sommer & Walter, 766 (Mal.)
Pizzi, T., with Neghme, Faiguenbaum, Roman, Donoso, Hoecker, Brncic, Agosin, Christen, Sotomayor, Silva & Vilches, 356 (Hel.)
Plotz, H., Bennett, B. L., Wertman, K., Snyder, M. J. & Gauld, R. L., 699 (Typh.)
Ployé, M., (304) (Mal.)
Pochard, P., with Ceccaldi, Trinquier & Vargues, 771 (Tryp.)
Poirier, M., with Deschiens, (350) (Hel.)
Poitrot, R., with Blanc, Bruneau & Delage, 892 (Typh.)
Pollock, J. S. M., 597 (Pl.)
Pomerat, C. M., Frieden, E. H. & Yeager, E., (170) (Bart.)
Pondé, A., 1074 (Tryp.)
Pondé, A. de A., with de Oliveira, J. L., & others, 314 (Tryp.)
Pontes, J. Fernandes, with Amaral & Pires, 824 (B.R.)
Poole, J., with Starkey, 517 (Am.)
Popper, J., 737 (Reports, etc.)
Porritt, R. J. & Olsen, R. E., 441 (Lep.)
Portela, B., 347 (Hel.)
Portier, A., with Aubry & Laffargue, 19 (Rab.)
Portugal, H., 439 (Lep.)
Potsch, N., with Magalhães Carvalho, Pinto, Schmidt & Costa, 635 (Def. Dis.)
Potts, W. H., 51 (Tryp.)
Pozo, S., with Ortuzar & Rosati, 605 (R.F.)
Pramanik, S. 181, (789) (Am.)
Prat, D., (351) (Hel.)
Pratt, H. D., 977 (Mal.)
Prezioso, A., with Nascimbene, 22 (Mal.)
Priest, J. B., with Dulaney, Almeda & Parker, 857 (Mal.)
Prost, with Sarrouy & Cabannes, (858) (Mal.)
Public Health Rep., 171, 513, 1082 (Pl.), 293 (Rab.), (724) (Hel.)
Pullman, T. N., with Alving, Craige, Jones, Whorton & Eichelberger, 953, 954 (Mal.)
——, with ——, ——, Whorton, Jones & Eichelberger, 951 (Mal.)
——, with ——, Eichelberger, Craige, Jones & Whorton, 956 (Mal.)
——, ——, Jones, R., Jr., Whorton, C. M., Craige, B., Jr. & Eichelberger, L., 865 (Mal.)
——, with Craige, Alving, Jones, Whorton & Eichelberger, 139 (Mal.)
——, ——, ——, Whorton, C. M., Jones, R., Jr. & Eichelberger, L., 955 (Mal.)
——, with ——, Eichelberger, Jones, Alving & Whorton, 953 (Mal.)
——, with ——, Jones, Whorton, Alving & Eichelberger, 33 (Mal.)
——, with ——, Whorton, Jones, Alving, Eichelberger & Rothman, 868 (Mal.)
——, Eichelberger, L., Alving, A. S., Jones, R., Jr., Craige, B., Jr. & Whorton, C. M., 952 (Mal.)
——, with Jones, Craige, Alving, Whorton & Eichelberger, 951 (Mal.)
——, with ——, Whorton, Craige, Alving & Eichelberger, 955 (Mal.)
——, with Whorton, Kirschbaum, Jones, Craige, Alving, Eichelberger & Coulston, 139 (Mal.)
——, with ——, ——, ——, Alving, Craige, Eichelberger & Coulston, 235 (Mal.)
——, with ——, Yount, Jones, Alving, Craige & Eichelberger, 140 (Mal.)
Puri, I. M., 155 (Mal.)
—— & Bhatia, M. L., 154 (Mal.)
—— & Krishnaswami, A. K., 154 *bis* (Mal.)
—— & Rajindar Pal, 154 (Mal.)
Putnam, P., Boyd, M. F. & Mead, P. A., 488 (Mal.)
—— & Hackett, L. W., 152 (Mal.)

Q.

Quan, S. F., Foster, L. E., Larson, A. & Meyer, K. F., 597 (Pl.)
——, with Meyer & Larson, 997 (Pl.)
Quelch, P., with Macfarlane, O'Brien, Douglas, Jope, Jope, Mole & Amos, 358 (Haem.)

R.

Rabinowitz, E., Aschner, M. & Grossowicz, N., 986 (Typh.)
Rachmilewitz, M., Braun, K. & de Vries, A., 984 (Leish.)
Rachou, R. G. & Ferreira, M. O., (234) (Mal.)
——, with Pinotti & Ferreira, 1053 (Mal.)
Radacovici, E., with Zotta, Teodorescu, Georgescu, Mardare, Duport, Atanasiu & Trifon, 133 (Mal.)
Radaeli, G., with Piccardi, 1092 (Lep.)
Radice, J. C., with Negroni, (1031) (Der.)
Radvan, I. & Apreotesci, C., (487) (Mal.)
Rae, W., 502 (Tryp.)
Raffaelli, D., 1038 (Ent.)
Rageau, J., (815) (Ent.)
Ragusin, with Montestruc, 345 (Lep.)
Ragusin, E., with Montestruc & Caubet, 259 (Hel.)
Rai, B. B., (526) (Hel.)
Rai Chaudhuri, M. N., with Chaudhuri, 35 (Mal.)
Rajindar Pal, with Puri, 154 (Mal.)
Ramakrishna, V., with Rao, 41 (Mal.)
——, with White & Rao, 233 (Mal.)
Ramakrishnan, S. P., with Afridi, Goswami & Menon, 239 (Mal.)
Ranganna, B., with Aiengar, Naidu & Krishnamurthy, 1105 (Haem.)
Rao, A. R. G., (305) (Mal.)
Ramirez, L. R., 641 *bis* (Vms.)
Ramos, A. S. & Assoreira, M., (983) (Tryp.)

Ranque, J., Ranque, M., Cabassu, J. & Cabassu, H., 883 (Leish.)
——, with Sautet, Vuillet & Vuillet, 856 (Mal.)
Ranque, M., with Ranque, Cabassu & Cabassu, 883 (Leish.)
Ransford, O. N., 618 (Hel.)
Rao, K. K. P. N., with Mitra, 206 (Ep. Drop.)
Rao, K. S., with Karamchandi, 333 (Pl.)
Rao, M. N., (648) (Heat Str.)
Rao, S. R., 896 (Chl.)
Rao, T. R., 233 (Mal.)
Rao, V. V., 137 (Mal.)
—— & Ramakrishna, V., 41 (Mal.)
——, with White & Ramakrishna, 233 (Mal.)
Raoult, A., (311) (Bl.)
——, with Tanguy & Robin, 905 (Am.)
Raper, A. B., 1017 (Hel.)
Rath de Souza, P., with de Souza Lima, Barba Rubio & de Souza Lima, 440 (Lep.)
Rau, L., 858 (Mal.)
Raul Etchegaray, E., with Bacigalupo & Trepat, 530 (Hel.)
Raun, E. S., with Knipling, Bushland, Babers & Culpepper, 815 (Ent.)
Ravenel, S. F., 168 (Typh.)
Rawlins, A. L., with Burckhalter, Tendick, Jones, Jones & Holcomb, (682) (Mal.)
Rawson, A. J., Collins, L. H., Jr. & Grant, J. L., 929 (Der.)
Ray, J. C., with Ghosh & Ghosh, 1002 (Am.)
Raymond, W. D., 468 (Misc. Dis.)
Raynal, J. H., 165, 251, 325 (Typh.), (705) (Chl.)
Raynal, M. J. H., 59 (Typh.)
Reardon, L. V., with Rees, 428 (Am.)
——, with ——, Jones, Griffin & Bartgis, 79 (Am.)
Rebelo, A., 231 (Mal.)
Recio, P. M., with Pesigan & Torres, (97) (Hel.)
Reddy, D. J., 71 (Typh.)
Redmond, W. B., 769 (Mal.)
Reed, R. K., with Anderson, Johnstone, Packer, Young, Callison, Hambly & Anderson, 903 (Am.)
Rees, C. W. & Reardon, L. V., 428 (Am.)
——, ——, Jones, F. E. & Griffin, A. M., with Bartgis, I. L., 79 (Am.)
——, with Tobie, 880 (Tryp.)
Reese, J. D., with Dubin & Seamans, 547 (Ent.)
Reeves, D. L. & Kerr, R. W., 448 (Hel.)
Reichenow, E., with Nauck, Enigk, Vogel, Westphal & Weyer, 1137 (B.R.)
Reid, J. A., 571, 1052 (Mal.)
—— & Wilson, T., 534 (Def. Dis.)
Reid, J. D., with Gosden, 639 (Haem.)
Reimann, H. A., 74 (Chl.)
Rein, C. R., with Dwinelle, Sheldon & Sternberg, 87 (Ys.)
Reitsema, R. H., (1061) (Mal.)
Relova R. N., 746 (Rab.)
Remlinger, P. & Bailly, J., 292, 387 (569), 669, 945 (Rab.)
Renner, K., 778 (Typh.)
Rens, M. R., 909 (Am.)
Restrepo, R. & Méndez Lemaitre, A., (340) (Am.)
Revol, L., Coudert, J. & Morel, P., 590 (Typh.)
Rey, H., 1053 (Mal.)
Reyes, A. C., with Lara, Gan & Matias, 351 (Hel.)
de Reyes Pugnaire, M., 922 (Hel.)
Reynes, V., 787 (Am.)
—— & Delbove, P., 61 *bis* (Typh.)
——, with ——, 61 *ter* (Typh.)
Rhees, M., with Lippincott, Ellerbrook & Mason, 527 (Hel.)
Rhodesia, Southern, 122 (Reports, etc.)
Ribeiro, D. O., with de Almeida, Ashcar, Lacaz & Sampaio 110 (Der.)
Richard, P., with Wanson & Toubac, 425 (Pl.)
Richardson, A. P., with Walker, 688 (Mal.)
——, with —— & Stauber 687 (Mal.)
Richardson, D. N., with Curd, Graham & Rose, (401) (Mal.)
Richardson, U. F., 1135 (B.R.)
Rickard, E. R. & Riley, E. G., 780 (Typh.)
Ricketts, W. E., 169, 893 (Bart.)
van Riel, J., (866) (Mal.)
Rigdon, R. H., 49, 978 (Mal.)
—— & McCain, B. E., 409, 687 (Mal.)
—— & Rostorfer, H. H., 979 (Mal.)
Rights, F. L. & Smadel, J. E., with E. B. Jackson, 702 (Typh.)
Riley, E. G., with Rickard, 780 (Typh.)
Rimington, C. & Fulton, J. D., with Sheinman, H., 244 (Mal.)
Ripper, W. E. & Tudor, P., (761) (Mal.)
Ripsom, C. A., with Yolles, Moore, DeGiusti & Meleney, 349 (Hel.)
Risi, J. B., 438 (Lep.)
Rita, G., 179 (Am.)
—— & Gramiccia, G., 158 (Mal.)
Rivero, M. D., 50 (Mal.)
Robbins, F. C., with Smadel & Snyder, 424 (Typh.)
Roberts, E. W., with Hill, 118 (Ent.)
Roberts, F. H. S., with Bang, Hairston & Maier, 45 (Mal.)
——, with Mackerras, 572 (Mal.)
—— & O'Sullivan, P. J., 968 (Mal.)
Robertson, J. D., 972 (Mal.)
Robin, C., with Tanguy & Raoult, 905 (Am.)
Robinson, E. B., with Huebner & Hottle, 594 (Typh.)
Robinson, S., with Haworth, (866) (Mal.)
Rocha, A., with de Magalhães, 618 (Hel.), (777) (Typh.)
——, with —— & Rodrigues, (777) (Typh.)
Roche, P. J. L., 800 (Hel.)
Rockefeller Foundation, 275 (Reports, etc.)
Rodaniche, A., with de Rodaniche, (892) (Typh.)
de Rodaniche, E. C. & Rodaniche, A., (892) (Typh.)
Rodhain, J., 978 (Mal.)
—— & van Hoof, M. T., (907) (Am.)
Rodrigues, I., with de Magalhães & Rocha (777) (Typh.)
Rodriguez, J. N., 439 (Lep.)
——, with Doull, Guinto & Bancroft, 525 (Lep.)
Rodriguez, L., with Mazzotti & Treviño, 261 (Hel.)
Rogers, E. W., (373) (Lab.)
Rogers, G. K., with Snyder, 1031 (Der.)
Rogers, K. B., 143 (Mal.)

Rogers, L., 101, 264 (Hel.), 614 (Lep.)
Rogers, M. A. T., with Stewart, 788 (Am.)
Rognoni, M., with Enriquez-Navarro, (1061) (Mal.)
Roman, E., 55 (Leish.)
Roman, J., with Neghme, Faiguenbaum, Pizzi, Donoso, Hoecker, Brncic, Agosin, Christen, Sotomayor, Silva & Vilches, 356 (Hel.)
Román P., J., 415 (Tryp.)
Romaña, C., 316 *bis*, (881) (Tryp.)
—— & Abalos, J., 314 (Tryp.)
—— & Gi, J., 316 (Tryp.)
Romeo Viamonte, J. M., with Clavero & Lozano, 238 (Mal.)
Rosati, S., with Ortuzar & Pozo, 605 (R.F.)
Rose, F. L., with Ashworth, Crowther & Curd, (866) (Mal.)
——, with Basford, Curd & Hoggarth, (148) (Mal.)
——, with Cliffe, Curd & Scott (866) (Mal.)
——, with Crowther & Curd, (866) (Mal.)
——, with Curd & Graham, (866) (Mal.)
——, with ——, —— & Richardson, (401) (Mal.)
——, with Gage & Scott, (588) (Tryp.)
Rose, H. M., with Culbertson, Hernandez-Morales, Oliver-Gonzalez, Figueroa Ortiz, Ruiz Reyes & Nettel, 101 (Hel.)
Rosen, A. P. & Scanlan, J. J. (1120) (Misc. Dis.)
Rosenberger, H. G., with Smith, Whiting, Baker, Beard & Saito, 929 (Der.)
Rosenfeld, G., with de Barros, (55) (Leish.)
——, with Maciel, (55) (Leish.)
Rosenfeld, M., with Jailer & Shannon, 575 (Mal.)
——, with ——, Zubrod & Shannon, 681 (Mal.)
——, Zubrod, C. G., Blake, W. D. & Shannon, J. A., 964 (Mal.)
Rosenstiel, R. G., 675 (Mal.)
Rosenthal, S. R. & Routien, J. B., 467 (Der.)
de Rosnay, D., 166 (Typh.)
Rosove, L., West, H. E. & Bower, A. G., 892 (Typh.)
Ross, C. M., 609 (Lep.)
Ross Institute of Tropical Hygiene, 654 (Reports, etc.)
Ross Institute of Tropical Hygiene (India Branch), 239 (Mal.)
Ross, H., (442) (Lep.)
Ross, P., 141 (Mal.)
Ross, S., with Tichenor & McLendon, 326 (Typh.)
Ross, S. G., 367 (Misc. Dis.), 551 (Reports, etc.), 595 (Den.)
Ross, W. F., 619 (Hel.)
——, with Blair, 1094 (Hel.)
——, with —— & Hawking, 526 (Hel.)
——, with Gorman, Meeser & Blair, 258 (Hel.)
——, with Hawking, 798 (Hel.)
——, with Loveridge & Blair, 716 (Hel.)
——, with Meeser & Blair, 794 (Hel.)
Rossell, C. S. C., with Fonte, 1091 (Lep.)
——, with de Souza-Araujo, 344 (Lep.)
Rostorfer, H. H., with Rigdon, 979 (Mal.)
Rotberg, A., 1013 (Lep.)
——, with Pessôa, 696 (Leish.)
Rothman, S., with Craige, Whorton, Jones, Pullman, Alving & Eichelberger, 868 (Mal.)
Roumagoux, J., (419) (Leish.)
Routien, J. B., with Rosenthal, 467 (Der.)
Row, R. & Patkar, N. A., (317) (Leish.)
Rowlett, R. J., Jr., with Lutz, (682) (Mal.)
Roy, H. K. & Bhattacharjee, R. C., (419) (Typh.)
Rozeboom, L., (969) (Mal.)
Ruchman, I., 650 (Prot.)
——, with MacFarlane, 1035 (Prot.)
Rudolph, A. M. & Braudo, J. L., (179) (Am.)
Rue, R. E., with Ward & Travis, 915 *bis* (Hel.)
Ruegsegger, J. M. & Gilchrist, H., (333) (Pl.)
Rugg-Gunn, M. A., 631 (Def. Dis.)
Ruhe, D. S., with Coatney & Cooper, 679 (Mal.)
——, with ——, ——, Josephson, Young & Burgess, 680 (Mal.)
——, with Cooper & Coatney, 140 (Mal.)
Ruiz Castaneda, M., 592 (Typh.)
Ruiz Reyes, F., 265 (Hel.)
——, with Culbertson, Rose, Hernandez-Morales, Oliver-Gonzalez, Figueroa Ortiz & Nettel, 101 (Hel.)
Russ, S. B., with Warren, 1035 (Prot.)
Russo, E. & Gomes, R. P., 930 (Der.)
Ryden, F. W., with Shaffer & Frye, 1001 (Am.)
Ryrie, G. A., 608, 609 (Lep.)

S

de Sa, J., with Bhatnagar, Fernandes & Divekar, 516, 601 (Chl.)
Sabin, A. B., with Melnick & Curnen, 1082 (Den.)
——, with Paul & Melnick, 1081 (Den.)
Sabine, J. C., with Wright & Wright, 975 (Mal.)
Sabrosky, C. W., with Young, Hardman, Burgess & Frohne, 674 (Mal.)
Saccà, G., with Gramiccia, 408 (Mal.)
Sachdev, R. N., with Heilig, 246 (Leish.)
Sacktor, B., with Granett, 121 (Ent.)
Sáenz Herrera, C., with Peña Chavarría, Cordero & Bolanos, 790 (R.F.)
Safwat, Y. & Adham, I., 898, 899 (Chl.)
Sagher, F., with Dostrovsky, 465 (Der.)
—— & Miterstein, B., 647 (Oph.)
Sah, P. P. T., with Anderson, Hansen & Cafiso, 520 (Am.)
Said el Ayadi, M., 720 (Hel.)
Saissac, R., with Chevé & Courdurier, 249 (Typh.)
Saito, M. T., with Smith, Whiting, Baker, Rosenberger & Beard, 929 (Der.)
Salar Luis, E., with Valdes Ruiz, (98) (Hel.)
Saleun, G. & Chassain, J., 875, 878 (Tryp.)
Salisbury, E. I., (750) (Mal.)
Salle, L., 432 (R.F.)
Salvin, S. B., 731 (Der.)
Sammons, H. G., with Cooke, Frazer, Peeney & Thompson, 535 (Sp.)
Sampaio, S., with de Almeida, Ribeiro, Ashcar & Lacaz, C. da S., 110 (Der.)
Sananes, N., with Monnerot-Dumaine, (30) (Mal.)
Sanchez Marroquin, A. & de los Angeles Gonzalez, M., 542 (Der.)
Sanchis Bayarri, V., Paris Pellicer, C., & Garcia Martinez, A., (800) (Hel.)
——, Selfa, J. & Marco Ahuir, R., (694) (Leish.)

Sanders, A., with Wallace & Mooney, 722 (Hel.)
Sandground, J. H., with Maynard, R., 585 (Tryp.)
Sandor, G., Girard, G. & Skrobisz, C., with Chevallier, A., 994 (Pl.)
—— & Giroud, P., 166 (Typh.)
——, —— & Skrobisz, C., 986 (Typh.)
Sandosham, A. A. 1045 (B.R.)
Santiago-Stevenson, D., Oliver-González, J. & Hewitt, R. I., 353 (Hel.)
Santos, M., 186 (R.F.)
Sapero, J. J., 32 (Mal.)
Sarkar, N. K., 1028 (Vms.)
Sarkaria, D. S., with Patton, (936) (Ent.)
Sarrazin, A., with Siguier & Périer, 518 (Am.)
Sarrouy, C., Prost & Cabannes, (858) (Mal.)
Satulsky, E. M., with Snow & Kean, 695 (Leish.)
Saunders, G. M., with Bianco, Levine & Cohn, 28 (Mal.)
—— & Scott, V., 135 (Mal.)
Sautet, J., 670 (Mal.)
——, Audouin, A., Levavasseur, G. & Vuillet, J., 45 (Mal.)
Sautet, J., Ranque, J., Vuillet, F. & Vuillet, J., 856 (Mal.)
Sautter, V., with Lépine & Levaditi, 329 (Y.F.)
Savoor, S. R. & Das Menon, P., with S. M. Merchant, 781 (Typh.)
——, Soman, D. W. & Vahia, N. S., 888 (Typh.)
——, Vahia, N. S. & Soman, D. W., 888, 1077 (Typh.)
Saxe, L. H., with Terzian, 496 (Mal.)
Sayago, G., 91 (Lep.)
Sayers, M. H. P. & Hill, I. G. W., 593 (Typh.)
Scanlan, J. J., with Rosen, 1120 (Misc. Dis.)
Schapera, I., 821 (B.R.)
Scheifley, C. H., 395 (Mal.)
Schepers, G. W. H., 266 (Haem.)
Scher, P., with Dormer, (110) (Der.)
Schmidt, M. M., with Magalhães Carvalho & Pinto, 728 (Def. Dis.)
——, with ——, ——, Potsch & Costa, 635, (Def. Dis.)
Schmieder, F., 887 (Typh.)
Schmitz, W. R. & Goette, M. B., 470 (Ent.)
Schneider, J., with Bovet, Decourt & Montezin, (873) (Mal.)
——, with Decourt, 148 (Mal.)
——, Dignat, M., Voron & Sfar, M., 868 (Mal.)
——, Larabi, M. & Balti, M., 868 (Mal.)
—— & Méchali, D., 865 (Mal.)
Schneider, R. F. & Shields, G. W., 179 (Am.)
Schneider, T., 679 (Mal.)
Schoen, R. *et al.*, 830 (B.R.)
Scholten, C., (912) (Lep.)
Schroeder, E. F., with Taggart, Earle, Berliner, Zubrod, Welch, Wise, London & Shannon, 958 (Mal.)
Schubert, M., 620, 621 *bis* (Hel.)
Schueler, F. W., 313 (Tryp.)
Schujman, S., 92 (Lep.)
Schujman, S., 92, 441, (911), 1010 (Lep.)
—— & Castañé Decoud, A., 1011 (Lep.)
Schuur, T. E., (338) (Am.)
Schwartz, H., with Chapman & Haislip, 788 (Am.)
Schwetz, J., 296, 392, 484 (Mal.), 348, 1015 (Hel.), 115 (Misc. Dis.)
——, with Baumann, H., Beumer & Fort, M., 230 (Mal.)
——, —— & Fort, M., 231, 748 *bis* (Mal.)
—— & Dartevelle, E., 348 (Hel.)
Scott, J. A., 808 (Hel.), 1038 (Ent.)
——, with Faust & McDaniel, 231 (Mal.)
Scott, M., with Cliffe, Curd & Rose, (866) (Mal.)
Scott, M. M., with Gage & Rose, (588) (Tryp.)
Scott, V., with Saunders, 135 (Mal.)
Scoville A. B., Jr., Bennett, B. L., Wertman, K. & Gauld, R. L., 700 (Typh.)
Scudder, S. T., with Berliner, Earle, Taggart, Zubrod, Welch, Conan, Baumon & Shannon, 960 (Mal.)
Seager, L. D. & Castelnuovo, G., 164 (Leish.)
Seal, S. C., 515 (Chl.)
Seaman, G. R., 932 (Prot.)
Seamans, L. A., with Dubin & Reese, 547 (Ent.)
Seaton, D. R., with Adams, 247 (Leish.)
Sédan, J., 1112 (Oph.)
Seiferle, E. J., with Frear, (373) (Ent.)
Selfa, J., with Sanchis Bayarri & Marco Ahuir, (694) (Leish.)
Sellers, T. F., 946 (Rab.)
Sellick, G., with Kettle, 571 (Mal.)
Semple, A. B., 330 (Den.)
Sen, A., (306) (Mal.)
Sen, N., with Dharmendra, 714 (Lep.)
Sen, P., (526), (712) (Lep.)
Sen, S., (1120) (Misc. Dis.)
Senevet, G., 1051 (Mal.)
Sen Gupta, P. C., 881 (Leish.)
——, Mallik, K. N. B. & Chakravarty, N. K., 882 (Leish.)
Sepulcri, P., 758 (Mal.)
Sergent, Ed., (550) (1039) (Reports, etc.)
—— & Sergent, Et., 937 (B.R.)
Sergent, Et., 463, 464, 540, 812 (Vms.)
——, with Sergent, 937 (B.R.)
Sfar, M., with Schneider, Dignat & Voron, 868 (Mal.)
Sforza, M., 887, 890 (Typh.), 1040 (Reports, etc.)
—— & Solinas, N., 890 (Typh.)
Shaffer, J. G. & Frye, W. W., 786 (Am.)
——, Ryden, F. W. & Frye, W. W., 1001 (Am.)
——, Walton, J. G. & Frye, W. W., 787 (Am.)
Shannon, J. A., with Berliner, Earle, Taggart, Welch, Zubrod, Knowlton & Atchley, 961 (Mal.)
——, with ——, ——, ——, Zubrod, Welch, Conan, Bauman & Scudder, 960 (Mal.)
——, Earle, D. P., Jr., Berliner, R. W. & Taggart, J. V., 956 (Mal.)
——, with ——, ——, ——, Welch, Zubrod, Wise, Chalmers & Greif, 957 (Mal.)
——, with ——, ——, ——, Zubrod, Welch, Bigelow & Kennedy, 963 (Mal.)
——, with —— & Welch, 959 (Mal.)
——, with Jailer & Rosenfeld, 575 (Mal.)
——, with ——, Zubrod & Rosenfeld, 681 (Mal.)
——, with Rosenfeld, Zubrod & Blake, 964 (Mal.)
——, with Taggart, Earle, Berliner, Welch, Zubrod, Jailer, Kuhn & Norwood, 960 (Mal.)
——, with ——, ——, ——, Zubrod, Welch, Wise, Schroeder & London, 958 (Mal.)

——, with Zubrod & Kennedy, 962 (Mal.)
Sharif, M., 596 (Pl.)
Sharp, T. M., with Goodson, Goodwin, Gorvin, Goss, Kirby, Lock, Neal & Solomon, 521 *bis* (Am.)
——, with Goodwin & Hoare, 521 (Am.)
Shelley, W. B., with Nelson, Eichna, Horvath & Hatch, 731 (Heat Str.)
——, with ——, Horvath, Eichna & Hatch, 732 (Heat Str.)
Shepard, C. C. & Huebner, R. J., 992 (Typh.)
——, with ——, Jellison, Beck & Parker, 509 (Typh.)
Sheinman, H., with Rimington & Fulton, 244 (Mal.)
Sheldon, A. J., with Dwinelle, Rein & Sternberg, 87 (Ys.)
Shepard, C. C., 71 (Typh.)
——, with Hottle, 248 (Typh.)
Shi Lu Chang & Negherbon, W. O., 590 (Leish.)
Shields, G. W., with Schneider, 179 (Am.)
Shih Lu Chang, 774 (Leish.)
Shipitsina, N. K., with Beklemischev, 297 (Mal.)
Shoaib, S., with Talaat, 719 (Hel.)
Shortt, H. E. & Garnham, P. C. C., 388, 762 *bis*, 872 (Mal.)
——, ——, Covell, G. & Shute, P. G., 482 (Mal.)
——, —— & Malamos, B., 388 (Mal.)
Shrapnel, B. C., 180 (Am.)
Shrivastava, D. L. & White, P. B., 334 (Chl.)
Shun-Shin, M., 84 (Am.)
Shute, P. G., 21 (Mal.)
—— & Maryon, M., 578, 751 (Mal.)
——, with Shortt, Garnham & Covell, 482 (Mal.)
——, with Ungureanu, 136 (Mal.)
Sicé, A., 312, 876 (Tryp.), (649) (Misc. Dis.)
Siegert, R., 988 (Typh.)
Siegler, A. M., 1049 (Rab.)
Sigalas, R. & Pautrizel, R., (1120) (Misc. Dis.)
Siguier, F., with Blanc, 1103 *bis* (Def. Dis.)
——, Sarrazin, A. & Périer, R., 518 (Am.)
Silberstein, W., 334 (Chl.)
Silva, C., R., with Neghme, Faiguenbaum, Pizzi, Roman, Donoso, Hoecker, Brncic, Agosin, Christen, Sotomayor & Vilches, 356 (Hel.)
Silva, F., (363) (Der.)
Silva, W., 675 (Mal.)
da Silva, E. M., (538) (Haem.)
da Silva, J. R. & Costa, N., 194 (Hel.)
da Silva, L. C. T., 95 (Hel.)
Simeons, A. T. W. & Chhatre, K. D., 39 (Mal.), 332 (Pl.)
Simmons, S. W., with Andrews, (816) (Ent.)
——, with Fay & Cole, 1037 (Ent.)
——, Ferguson, F. F. & Upholt, W. M., 581 (Mal.)
——, with McCauley & Fay, 760 (Mal.)
Simms, B. R. & Kiker, C. C., 1061 (Mal.)
Simões, T. S., with de Meira & Nogueira, 1031, (Der.), 1092 (Hel.), 1122 (Ent.), 1130 (Reports, etc.)
Simons, R. D. G. P., 792 (Lep.)
Simpson, J. A., with Black, 204 (Sp.)
Simpson, J. C. E., with Keneford, Lourie, Morley, Williamson & Wright, 690 (Tryp.)
Simpson, M. L., 873 (Mal.)
Singer, J., (86) (R.F.)
Singh, I., 1059 (Mal.)
Singher, H. O., Millman, N. & Bosworth, M. R., 682 (Mal.)
Sinha, Y. K., with Ghosal, 882 (Leish.)
Sippe, G. & Twining, M., 134 (Mal.)
Sisson, R. B., with King, Gilchrist, Wootton, Donaldson, Macfarlane, Jope, O'Brien, Peterson & Strangeways, 359 (Haem.)
Skinner, J. C., 630 (Hol.)
Skrobisz, C., with Sandor, Girard & Chevallier, 994 (Pl.)
——, with —— & Giroud, 986 (Typh.)
Slaten, E. F., (538) (Haem.)
Sloss, M. W., with Benbrook, 1137 (B.R.)
Smadel, J. E. & Jackson, E. B., 779 (Typh.)
——, —— & Gauld, R. L., 321 (Typh.)
——, Léon, A. P., Ley, H. L., Jr. & Varela, G., 1077 (Typh.)
——, with Ley & Crocker, 1076 (Typh.)
——, with Rights & Jackson, 702 (Typh.)
——, Snyder, J. C., Jackson, E. B., Fox, J. P., & Hamilton, H. L., 168 (Typh.)
——, Snyder, M. J. & Robbins, F. C., 424 (Typh.)
Smarr, R. G., with Coatney, Cooper, Young & Burgess, 150 (Mal.)
Smith, C. E., Whiting, E. G., Baker, E. E., Rosenberger, H. G., Beard, R. R. & Saito, M.T., 929 (Der.)
Smith, C. N. & Gouck, H. K., (548) (Ent.)
Smith, D. J. W., with Streeten, Cohen, Gutteridge, Wilmer, Brown & Derrick, 891 (Typh.)
Smith, D. T., & Harrell, E. R., Jr., 814 (Der.)
Smith, H., with Field & Johnston, 577 (Mal.)
Smith, M. S., (471) (Ent.)
Smith, R. E., Steele, J. M., Eakin, R. E. & Cowie, D. B., 985 (Leish.)
Smith, R. M., with Ehrlich, Bartz & Joslyn, 779 (Typh.)
Smith, W. E. & Pennell, R. B., 514 (Chl.)
Smyth, J. D., (350) (Hel.)
Snell, D. G. & Mukasa, S. B. K., (1100) (Hel.)
Snow, J. S., Satulsky, E. M. & Kean, B. H., 695 (Leish.)
Snuparek, J., 480 (Mal.)
Snyder, B. L. & Rogers, G. K., 1031 (Der.)
Snyder, F. M. & Morton, F. A., 252 (Typh.)
Snyder, J. C., with Smadel, Jackson, Fox & Hamilton, 168 (Typh.)
Snyder, M. J., with Plotz, Bennett, Wertman & Gauld, 699 (Typh.)
——, with Smadel & Robbins, 424 (Typh.)
Solé, with Gaud & Fauré, 1015 (Hel.)
Solinas, N., with Sforza, 890 (Typh.)
Solomon, W., with Goodson, Goodwin, Gorvin, Goss, Kirby, Lock, Neal & Sharp, 521 *bis* (Am.)
Soman, D. W., 701 (Typh.)
—— & Das Menon, V. K., 890 (Typh.)
——, with Savoor & Vahia, 888 *bis*, 1077 (Typh.)
Sommer, H. E., with Freund, Thomson, Walter & Pisani, 766 (Mal.)
——, with Thomson, Freund & Walter, 49 (Mal.)

Sommerville, T., with Mulligan, 495 (Mal.)
Soong, T. H., with Ho & Li, 694 (Leish.)
Soriano Lleras, A., 745 (Rab.)
Sorour, A., with Ibrahim & El-Sherif, 914 (Hel.)
Soto Figueroa, E., with González Ochoa, 270 (Der.)
Sotolongo, F., with Basnuevo, (341) (Am.)
Sotomayor D. R., with Neghme, Faiguenbaum, Pizzi, Roman, Donoso, Hoecker, Brncic, Agosin, Christen, Silva & Vilches, 356 (Hel.)
de Sousa, E. F., with Penido, Azevedo, Pinto Bezerra & Moura, 408 (Mal.)
Sousa e Faro, 1114 (Oph.)
Soutar, S. F., with Morton, 257 (Am.)
Southcott, R. V., 251 (Typh.)
South Pacific Board of Health, 1040 (Reports, etc.)
de Souza-Araujo, H. C., 346, (436), (441), (712) (Lep.), 1132 (B.R.)
—— & Rossell, C. S. C., 344 (Lep.)
de Souza Campos, N., with de Souza Lima, 658 (B.R.), 712 (Lep.)
de Souza Lima, L., 714 (Lep.)
——, with de Souza Lima, Barba Rubio & Rath de Souza, 440 (Lep.)
—— & de Souza Campos, N., 658 (B.R.), 712 (Lep.)
de Souza Lima, M., Barba Rubio, J., de Souza Lima, L. & Rath de Souza, P., 440 (Lep.)
Soysa, E., 395 (Mal.)
Spadaro, O., 390 (Mal.)
Spena, A., 212 (Prot.)
Spencer, C. F., with Kuehl & Folkers, (866) (Mal.)
Spicknall, C. G. & Terry, L. L., 753 (Mal.)
Spies, T. D., Garcia Lopez, G., Milanes, F., Lopez Toca, R. & Culver, B., 923 (Sp.)
——, ——, Stone, R. E., Milanes, F., Brandenburg, R. O. & Aramburu, T., 460 (Sp.)
——, ——, ——, ——, Toca, R. L. & Aramburu, T., 462 (Haem.)
Spingarn, C. L. & Edelman, M. H., 428 (Am.)
Spinks, A., (588), 772 (Tryp.)
Spitler, D. K., 860 (Mal.)
Srivastava, R. S., 862 (Mal.)
Stage, H. H., 735, (1037) (Ent.)
—— & Giglioli, G., 308 (Mal.)
—— & Gillette, H. P. S., 572 (Mal.)
Stahman, A. W., with Watson & Bilello, 926 (Haem.)
Stannus, H. S., 76 (Am.)
Starkey, H. & Poole, J., 517 (Am.)
Stauber, L. A., with Walker & Richardson, 687 (Mal.)
Stedman, M. M., with Borrow, Fowden, Waterlow & Webb, 729 (Def. Dis.)
Steele, J. M., with Smith, Eakin & Cowie, 985 (Leish.)
Stefanopoulo, M. G. J. & Duvolon, S., 252 (Y.F.)
Steiniger, F., 1008 (Lep.)
Steinitz, E., 334 (Chl.)
Steinle, M. L., with Jones, Newton, Weibel, Warren & Figgat, 917 (Hel.)
Stephen, J. D., 810 (Haem.)
Sternberg, T. H., with Dwinelle, Sheldon & Rein, 87 (Ys.)
Sternfeld, J. & Hirsch, W., 273 (Ulc.)
Stewart, G. T., 76 (Am.)
—— & Jones, W. R., 1001 (Am.)
——, —— & Rogers, M. A. T., 788 (Am.)
——, O'Meara, P. J. & Kershaw, W. E., 1002 (Am.)
Stewart, H. W., with Hewitt, Kushner, White, Wallace & SubbaRow, 455 (Hel.)
——, with ——, White, Wallace, Kushner & SubbaRow, 455 (Hel.)
Stewart, I. S., with Bodman, 433 (R.F.)
Stewart, W., 930 (Heat Str.)
Stickney, J. M., with Estes & Farber, 538 (Haem.)
Stirewalt, M. A., with Kuntz & Buchheit, 621 (Hel.)
Stokstad, E. L. R., with Jukes, (538) (Sp.)
Stoll, N. R., (921) (Hel.)
——, with Franks & Chenoweth, 453 (Hel.)
——, with Loughlin, 722 (Hel.)
Stollerman, G. H., with Alleman, (1026) (Def. Dis.)
Stone, R. E., with Spies, Garcia Lopez, Milanes, Brandenburg & Aramburu, 460 (Sp.)
——, with ——, ——, ——, Toca & Aramburu, 462 (Haem.)
Stovall, S., with Kulowski, (269) (Der.)
Stowe, M., (927) (Haem.)
Strahan, J. H., 574, 749 (Mal.)
Strangeways, D. H., with King, Gilchrist, Wootton, Donaldson, Sisson, Macfarlane, Jope, O'Brien & Peterson, 359 (Haem.)
Straus, B. & Gennis, J., 974 (Mal.)
Strauss, E. & Sulkin, S. E., 783 (Typh.)
——, with ——, 783 (Typh.)
Strauss, W., 334 (Chl.)
Streeten, G. E. W., Cohen, R. S., Gutteridge, N. M., Wilmer, N. B., Brown, H. E., Smith, D. J. W. & Derrick, E. H., 891 (Typh.)
Stryker, W. A., 457 (Hel.)
Stubbs, T. H., with Young & Ellis, 236 (Mal.)
Study, R. S. & Morgenstern, P., 814 (Der.)
Sturdza, N., with Dumitresco, Constaninesco & Botez, 1076 (Typh.)
Suarez, H., with Yanniceli & Castro Casal, (98) (Hel.)
Suarez, R. M., (107) (Sp.)
SubbaRow, Y., with Harned, Cunningham, Halliday, Vessey, Yuda, Clark, Hine & Cosgrove, 628 (Hel.)
——, with Hewitt, Kushner, Stewart, White & Wallace, 455 (Hel.)
——, with ——, Wallace & White, 454 (Hel.)
——, with ——, White, Wallace, Stewart & Kushner, 455 (Hel.)
Sucgang, E., with Del Mundo, Baltazar & Palarca, 531 (Hel.)
Sulkin, S. E., & Strauss, E., 783 (Typh.)
——, with —— 783 (Typh.)
Surraco, N. L. & Galeano Muñoz, J., (98) (Hel.)
Sutorisova-Stolsova, M., 166 (Typh.)
Swellengrebel, J. M. H., with Swellengrebel & Lodens, (470) (Ent.)
Swellengrebel, N. H., 74 (Pl.)
——, Lodens, J. G. & Swellengrebel, J. M. H., (470) (Ent.)
Swierstra, D., 1099 (Hel.)
Symes, C. B., Hadaway, A. B., Barlow, F. & Galley, W., 588 (Tryp.)
Symmers, D., (1119) (Misc. Dis.)

T

Tabern, D. L., with Albright & Gordon, 181 (Am.)
Tabusse, with Crosnier, Merle, Bernier & Molinier, 1086 (Am.)
Taggart, J. V., with Berliner, Earle, Welch, Zubrod, Knowlton, Atchley & Shannon, 961 (Mal.)
——, with ——, ——, Zubrod, Welch, Conan, Bauman, Scudder & Shannon, 960 (Mal.)
——, Earle, D. P., Jr., Berliner, R. W., Welch, W. J., Zubrod, C. G., Jailer, J. W., Kuhn, B. H., Norwood, J. & Shannon, J. A., 960 (Mal.)
——, with ——, ——, ——, ——, Wise, Chalmers, Greif & Shannon, 957 (Mal.)
——, with ——, ——, Zubrod, Welch, Bigelow, Kennedy & Shannon, 963 (Mal.)
——, ——, ——, ——, ——, Wise, N. B., Schroeder, E. F., London, I. M. & Shannon, J. A., 958 (Mal.)
——, with Shannon, Earle & Berliner, 956 (Mal.)
Takos, M., with Elmendorf, Barnhill & Hoekenga, 1064 (Mal.)
Talaat, S., with Erfan, 715 (Hel.)
Talaat, S. M., 1093 (Hel.)
——, Shoaib, S., 719 (Hel.)
Taliaferro, L. G., with Taliaferro, 768 (Mal.)
Taliaferro, W. H., 1120 (Prot.)
—— & Taliaferro, L. G., 768 (Mal.)
Tanamal, S. J. W., 706 (Chl.)
Tanguy, F., with Durieux & Trenous, 905 (Am.)
——, Robin, C. & Raoult, A., 905 (Am.)
Tarzwell, C. M., 46 (Mal.)
Taylor, J., 599 (Chl.)
—— & Becker, E. R., 773 (Tryp.)
Taylor, R. M., with Waddell, 72, 510 (Y.F.)
Tchernomoretz, I., with Adler & Ber, 774 (Leish.)
Tedeschi, G. G., 932 (Prot.)
Teixeira, A. W. G., with de Azevedo & Coito, 985 (Leish.)
Temkine, M., (30) (Mal.)
Tendeiro, J., 252 (Typh.)
Tendick, F. H., with Burckhalter, Jones, Jones, Holcomb & Rawlins, (682) (Mal.)
Tenenberg, D. J., with Furcolow & Bunnell, 644 (Der.)
—— & Howell, A., Jr., 644 (Der.)
Teodorescu, A. M., with Zotta, Radacovici, Georgescu, Mardare, Duport, Atanasiu & Tirfon, 133 (Mal.)
Terry, L. L. & Bozicevich, J., 1084 (Am.)
——, with Spicknall, 753 (Mal.)
Terzian, L. A., 767 (Mal.)
—— & Saxe, L. H., 496 (Mal.)
Tetzlaff, F., 871 (Mal.)
Teuber, I., (896) (Chl.)
Theiler, G., (935) (Ent.)
Theiler, M., with Clarke, 686 (Mal.)
Theodor, O., 934 (Ent.)
Thibault, C., with Thuret, 616 (Hel.)
van Thiel, P. H., 826 (B.R.)
——, with Doeleman, 670 (Mal.)
——, with Winsser, Verlinde, Davel & van der Elst, 1036 (Prot.)
Thiodet, J., (921) (Hel.)
Thomas, H. M., Jr., with Bracken & Bailey, 1098 (Hel.)
Thomas, M. G., with Heath & Wilson, 1109 (Oph.)
Thomison, S. J., with Miller, 469 (Misc. Dis.)
Thompson, G. A., (370) (Ent.)
Thompson, M. D., with Cooke, Frazer, Peeney & Sammons, 535 (Sp.)
Thompson, P. E., McGinty, D. A., Bush, D. L. & Wilson, M. L., 1066 (Mal.)
Thompson, R. H. S. & Whittaker, V. P., 57 (Leish.)
Thomson, K. J., Freund, J., Sommer, H. E. & Walter, A. W., 49 (Mal.)
——, with ——, ——, —— & Pisani, 766 (Mal.)
Thomson, R. C. M., 405, 482 (Mal.)
Thomson, W. A. R., 1128 (Reports, etc.)
Thorp, J. M. & de Meillon, B., (275) (Ent.)
——, with ——, 149 (Mal.)
——, with —— & Hardy, 789 (R.F.)
Thuret, C. & Thibault, C., 616 (Hel.)
Thurston, J. P., with Hawking & Perry, 685 (Mal.)
Tichenor, C. J., Ross, S. & McLendon, P. A., 326 (Typh.)
Tieh, T. H., Landauer, E., Miyagawa, F., Kobayashi, G. & Okayasu, G., 512 (Pl.)
Timms, G. L., with Garnham, Davies & Heisch, 86 (R.F.)
Tiner, J. D. & Chin, T. H., (921) (Hel.)
Tiong, J. O., with Ignacio, 612 (Lep.)
Tisseuil, J., 189 (Lep.), 980 (B.P.)
Tobie, E. J. & Rees, C. W., 880 (Tryp.)
Toca, R. L., with Spies, Garcia Lopez, Stone, Milanes & Aramburu, 462 (Haem.)
Todd, K. W., 502 (Tryp.)
Tomassino, P., with Fernández & Carboni, 1012 (Lep.)
Tomcsik, J., (708) (Chl.)
Tompkins, V. N. & Miller, J. K., 84 (Am.)
Tonkin, I. M., 243 (Mal.)
—— & Hawking, F., 243, 409 (Mal.)
——, with King, (148) (Mal.)
Tonking, H. D. & Gébert, S., 241 (Mal.)
——, Lavoipierre, R. & Courtois, C. M., 241 (Mal.)
Topciu, V., (87) (R.F.)
Topping, N. H., with Montoya & Osejo, 419 (Typh.)
Torres, C. M., Muniz, J., Cardoso, R. A. de A. & Duarte, E., 776 (Leish.)
Torres, L. F., Jr., with Pesigan & Recio, (97) (Hel.)
Torres Cañamares, F., 672 (Mal.)
Totterman, G., 449 (Hel.)
Toubac, M., with Wanson & Richard, 425 (Pl.)
Toumanoff, C. & Hérivaux, A., 995 (Pl.)
——, with ——, 596 (Pl.)
—— & Le-Van-Phung, 354 (Hel.)
—— & Nguyen Van Huong, 355 (Hel.)
Towne, C. E., (1023) (Hel.)
Trager, W., 159, 398 (Mal.)
Trans. Roy. Soc. Trop. Med. & Hyg., 76 (Am.)
Travis, B. V., 241 (Mal.)
Travis, D., with Ward & Rue, 915 *bis* (Hel.)
Trenous, J., with Durieux & Tanguy, 905 (Am.)
Trepat, L., with Bacigalupo & Raul Etchegaray, 530 (Hel.)

Trethewie, E. R. & Day, A. J., 812, 1029, (Vms.)
Treviño, A., with Mazzotti & Rodriguez, 261 (Hel.)
Trifon, A., with Zotta, Radacovici, Teodorescu, Georgescu, Mardare, Duport & Atanasiu, 133 (Mal.)
Trincão, C., 695 (Leish.)
Trinquier, E. & Arnoult, H., 313 (Tryp.)
—— & Ceccaldi, J., 928 (Vms.)
——, with ——, 927 (Vms.)
——, with ——, Pochard & Vargues, 771 (Tryp.)
—— & Pellissier, A., 877 *bis* (Tryp.)
Trowell, H. C., 925 (Haem.)
——, with Holmes, 726 (Def. Dis.)
Tudor, P., with Ripper, (761) (Mal.)
Tuna, I., 421 (Typh.)
Tupas, A. V. & Mañalac-Morales, S., 627 (Hel.)
Turner, T. B., McLeod, C. & Updyke, E. L., 89 (Ys.)
Tusing, T., with Consolazio & Pecora, 112 (Heat Str.)
Twining, M., with Sippe, 134 (Mal.)

U

van Ufford, W. J. Q., (108) (Haem.)
Underwood, E. A., 599 (Chl.)
Ungari, C., 477 (Rab.)
Ungureanu, E. & Shute, P. G., 136 (Mal.)
United Nations Department of Social Affairs Population Division, Lake Success, New York, 819 (Reports, etc.)
United States Nav. Med. Bull., (658) (Reports, etc.)
United States Public Health Service and Tennessee Valley Authority, 822 (B.R.)
Updyke, E. L., with Turner & McLeod, 89 (Ys.)
Upholt, W. M., with Simmons & Ferguson, 581 (Mal.)

V

Vachon, M., (812), (1029) (Vms.)
Vahia, N. S., with Savoor & Soman, 888 *bis*, 1077 (Typh.)
Vaisman, A., with Levaditi, 182 (R.F.)
——, with —— & Dunoyer, 290 (Rab.)
Valderrama Delgado, A., with Villalobos, 300 (Mal.)
Valdes Ruiz, M. & Salar Luis, E., (98) (Hel.)
Valentine, W. N. & Neel, J. V., 927 (Haem.)
Valero, A., with Haddad, 784 (Pl.)
Valla, C., with Livadas, Belios & Koroghiannaki, 758 (Mal.)
Valle, S., 1090 (Lep.)
Valls, D. J., 416 (Tryp.)
Vanbreuseghem, R., 464 (Der.), (710) (Ys.)
van der Elst, P., with Winsser, Verlinde, van Thiel & Davel, 1036 (Prot.)
van der Kuyp, E., 301 (Mal.)
Vanderplank, F. L., 51, 244, 413 (Tryp.)
van der Sar, A., with Hartz & Hugenholtz, 200 (Hel.)
van der Scheer, J., Bohnel, E. & Cox, H. R., 60 (Typh.)
van de Stadt, F. R., with Hartz, 352 (Hel.)
Varela, G. & Avila, C., 363 (Der.)
——, with Bustamante, 165, 252 (Typh).
—— & Mazzotti, L., 251 (Typh.)
Varela, G., with Smadel, Léon & Ley, 1077 (Typh.)
Vargas, L. (809) (Hel.), 1123 (Ent.)
—— & Matheson, R., (1053) (Mal.)
Vargues, R., with Ceccaldi, Trinquier & Pochard, 771 (Tryp.)
——, with Giroud, 1075 (Typh.)
Vartiainen, I. & Bastman-Heiskanen, L., 449 (Hel.)
Vasiliu, V., with Combiesco & Dumitresco, 169 (Typh.)
Vaucel, M. & Ceccaldi, J., 503 (Tryp.)
——, with Gaud & Khalil Bey, 432 (R.F.)
Vaughan-Jones, T. G. C., 879 (Tryp.)
Vedder, E. B., 358 (Sp.)
Veeraraghavan, N., 19, 855 (Rab.)
——, with Ahuja & Menon, 361 (Vms.)
da Veiga, S., 1091 (Lep.)
Vendrely, R., with Callot, 990 (Typh.)
Venkatraman, K. V., with Adiseshan & Pandit, 336 (Chl.)
Verhaart, W. J. C., with Bonne & Bras, (1108) (Der.)
Verlinde, J. D., with Winsser, van Thiel, Davel & van der Elst, 1036 (Prot.)
Vessey, R. E., with Harned, Cunningham, Halliday, Yuda, Clark, Hine, Cosgrove & Subbarow, 628 (Hel.)
Vieira Braga, R., 1090 (Lep.)
Vilches, R., with Neghme, Faiguenbaum, Pizzi, Roman, Donoso, Hoecker, Brncic, Agosin, Christen, Sotomayor & Silva, 356 (Hel.)
Villalobos, C., E. & Valderrama Delgado, A., 300 (Mal.)
Vincke, I. H. & Lips, M., 979 (Mal.)
Vine, J. M., 492 (Mal.)
Viotti, M. R., with Lacaz, Ashcar & Costa, 1107 (Der.)
Viswanathan, D. K. & Baily, J. D., 754 (Mal.)
Voelcker, F. W., 472 (Reports, etc.)
Vogel, H., 93 (Hel.)
—— & Minning, W., 196 (Hel.)
Vogel, J., with Nauck, Enigk, Reichenow, Westphal & Weyer, 1137 (B.R.)
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